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Plummer J. C.

THE MECHANICS, MECHANICAL ANATOMY, AND MECHANICAL DISTORTIONS OF THE BONY STRUCTURE OF THE HUMAN FOOT.

BEING A SYNOPSIS OF A DEMONSTRATION GIVEN BEFORE THE MEDICAL SCHOOLS
AND SOCIETIES IN BOSTON, NEW YORK, AND PHILADELPHIA.

BY J. C. PLUMER, M. D., BOSTON, MASS.

Entered according to Act of Congress in the year 1861, by JOHN C. PLUMER, in the Clerk's
Office of the District Court of the District of Massachusetts.

Only the more serious, congenital deformities of the human foot, such as the varieties of CLUB-FOOT, &c., have generally engaged the attention of surgeons. Many physicians of skill, among them Ferguson, Liston, Druit, Astley Cooper, and others, have alluded to the more important mechanical distortions, such as BUNION, SPLAY-FOOT, &c., with suggestions as to the proper surgical treatment required. Sir Benj. Brodie, in his "Clinical Lectures," has devoted an entire chapter to "corns and bunions," and their treatment, (from the works above referred to Vol. 1 is a compilation,) but none of them have commenced with the cause of very many of these troublesome distortions, the shoemaker's last. So long as boots and shoes are fashioned upon blocks of wood having no features in common with those of the foot, they must, as a matter of course, produce distortions upon the feet of the wearer.

If "the cut of a shoe is not, as the cut of a coat, a matter of indifference," most certainly the form of the last should not be a subject of fashionable change, especially in its important qualities.

If "when fashion prescribes an arbitrary form of a shoe, she goes far beyond her province, and in reality arrogates to herself the right of determining the shape of the foot," how is it when she prescribes the form and proportions of the last upon which the shoe is moulded?

At present, the last-maker produces a fashionable last, and from it, the bootmaker a fashionable boot, and our feet, alone at fault, in the estimation of both last and shoemaker, have to suffer; for if the boot is not made to fit the foot, the foot must be made to fit it, and in doing this the foot is distorted.

One of the plainest indications of a want of propriety in the construction of our foot clothing is the universally distorted condition of the human

foot, and the proportionate majority of pedal distortions among the disciples of St. Crispin is, to say the least, suggestive.

In order for a bootmaker to have "a really nice perception of what he is to undertake," the surgical instrument he is to construct, he should have some knowledge of the anatomical mechanism of the human foot, especially of the solid structure, and should "study the habits of the individual foot, manner of stepping, whether natural and free, or restrained, and whether inward, or outward, or straight forward."

The line of direction, and distance from the heel, of the ball or joint of the great toe, should be carefully considered, for "upon it, the weight of the body turns at every step." And the relation of the corresponding points in the sole of the shoe is important to a firm, elastic, and easy tread, as well as to the economical wearing and comfort of the boot.

That boot and shoemaking, and the requirements and abuses of the foot, are subjects upon which the people should be better informed, and upon which more attention bestowed, does not admit of question. A properly constructed boot or shoe is essential to thorough muscular development, and health; for without them healthful exercise is tedious, if not impossible.

In distortion of the foot, the Chinese are, as a nation, content with a less degree than ourselves, their idea of elegance requiring but one especial deformity, viz., bending under of the toes against the palm of the foot, for the purpose of shortening it.

We are satisfied with nothing less than a general distortion of the entire foot, in all its joints and throughout its entire construction, and also of the ankle joint.

Dislocation of the great toe joint, or BUNION, inversion of the transverse, and flattening of the longitudinal arch, or flat and splay-foot, are the degree of distortion required by us; and for the gradual production of which, our common shoe, is an instrument which cannot be surpassed by any one, however ingenious, or whatever his cleverness in mechanics, or knowledge of anatomy.

The object of this pamphlet is to call attention to some of the more important mechanical distortions, with a view to the ultimate removal of their cause.

And this is to be accomplished only by the exactions of public sentiment; for it is not unnatural that the shoemaker, hitherto enjoying handsome patronage and attending profit, should be satisfied with his own productions, and quite disinclined to the pecuniary inconvenience and outlay attending a change of the accessories of his art, and substituting other for his own models, simply for the benefit of his patrons; even if he is sufficiently intelligent and unbiased to appreciate an improvement; nor would it be unprecedented his derogation if any innovation, or disbelief in the possible origin of an improvement outside his own craft.

Many of the diagrams are intended exaggerations, with the view of rendering the principles involved more appreciable to all.

METATARSO-PHALANGEAL, OR TRANSVERSE ARCH.

Of subluxation of the first METATARSO-PHALANGEAL ARTICULATION, or BUNION.



Fig. 1

Represents the outline of the *bony structure* of the natural foot in its integrity, with the bones of each toe in their normal, relative position.

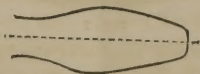


Fig. 2

Represents the outline of the common *boot-sole*, "*too narrow and pointed for the part it is to contain.*" (Vol. 2, pp. 4 and 6.)

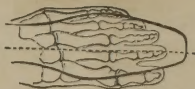


Fig. 3

Represents the relation of the *narrow and pointed sole* to the *bony structure* of the well-formed foot. The effect upon the foot, of wearing which is seen in

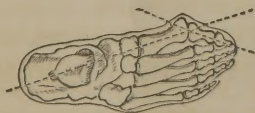


Fig. 4

Outline of the bony structure of the foot distorted by subluxation of the FIRST METATARSO-PHALANGEAL ARTICULATION, or great toe joint, an essential anatomical and mechanical condition of BUNION. Also the cause of "ingrowing toe nail." (Fig. 6, Vol. 2.)



Fig. 5

Represents a vertical transverse section of the ball portion of the *Common Last*, convex on the under surface.



Fig. 6

Represents a vertical transverse section of the ball portion of the *Patent Last*, concave on the under surface.



Fig. 7

Represents a vertical transverse section of the ball portion of a *boot*, from the *Common Last*, showing S, (the sole,) concave on its upper, and convex on its under surface.

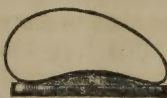


Fig. 8

Represents a vertical transverse section of the ball portion of a *boot* from the *Patent Last*, showing S, (the sole,) convex on its upper and flat on its under surface.

Elevation F, fig. 8, affords uniform support to this portion of the sole of the foot, and prevents lateral gliding motion and treading out or inwards of the foot; important to the even and economical wearing of the boot. (Figs. 9, 10, 11, and 12.)

INVERSION OF THE METATARSO-PHALANGEAL OR TRANSVERSE ARCH.



Fig. 9

Represents a vertical transverse section of the natural foot near the metatarso-phalangeal articulations, or *transverse arch*. B, bony structure; lines a a show the *naturally arched* form of this portion of the foot.



Fig. 10

Demonstrates the adaptation of the boot sole, (S,) transversely convex on its upper surface, (formed upon the Patent Last, fig. 6,) to this part of the undistorted foot, affording uniform support, and preventing callosities upon, and distortion of the joints. (Vol. 2, pp. 4 and 6.)



Fig. 11

Demonstrates the *antagonistic* relation of the *boot-sole transversely concave* upon its upper surface, (made upon the Common Last, fig. 5,) to the sole of the natural foot. The concave sole is opposed to the *naturally* concave surface of the foot, and the space C resulting, the only bearing points of that portion of the foot upon the *boot-sole* being at J, the joints of the great and little toes, the "breaking in" of the boot, as will be readily comprehended, consists in part, in pressing and flattening the sole, S, to the floor, F F. In attempting this upon a thick, unyielding sole, the parts suffer from undue pressure and become the seat of painful callosities. (Vol. 1, fig. 1, a.)

The margins only, of the foot resting upon the margins of the concave at J J, an ellipsis is formed represented by lines L L and l l, and the middle portion of the foot being unsupported, the unavoidable tendency is flattening, which is represented in



Fig. 12

Flattening or inversion of the metatarso-phalangeal or transverse arch, indicated by the *inverted* curve, L, L, and produced by wearing the unyielding boot-soles formed upon common lasts. In this affection, the metatarsal and phalangeal, or, *toe-bones*, by gliding down the latterly inclined planes of the *boot-sole*, to the centre C, are approximated or crowded together, producing compression and atrophy of the tissues lying between them, and destroying the elasticity of this portion of the foot.



Fig. 13

Represents the outline of the *bony structure* of the *bottom or sole* of the foot. B, the under surface of the first Metatarso-Phalangeal Articulation, or great toe joint, or ball of the great toe. H, the heel.

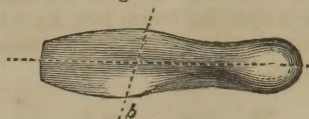


Fig. 14

Represents the *bottom or sole* of the Patent Last. The *ball seat, b*, corresponding with the point B in fig. 13, should be properly formed, *well defined*, in the *right direction* and of *suitable distance* from the *heel seat, H*, so as to produce by the aid of the workman's hammer a depression upon the upper surface of the insole, which shall correspond with and receive the lower rounding surface of the ball of the great toe, and prevent the necessity of producing the depression with the joint itself, in which consists, in part, the "breaking in" of the boot, an efficient auxiliary to the production of Bunion, Gout, &c. The same applies to the outer portion of the foot.

These depressions are both obvious and palpable, upon the upper surface of a boot-sole which has been worn for several weeks, and are produced by the pressure of the under surface of the toe joints.

It is not sufficient that the *horse's shoe* be *curved* instead of *square*, but it is important that the curve be adapted in *form* and *degree* to that of the hoof.

Neither is it sufficient in making a *SHOE* for the *human foot*, that the LAST on which it is fashioned be simply *concave on the under surface*, the *form* and *degree* of concavity is no less important to the production of a properly formed *sole*.

With the *PATENT LAST*, as with the old, it is neither requisite or desirable that they should be especially made for each individual. Different *styles* are made to represent the different styles of feet, from which an intelligent craftsmen is expected to make a proper selection. The *styles* of feet are as susceptible of classification as those of *person*, and there is no reason why a ready-made boot or shoe should not be as well adapted to its purpose as a ready-made coat.



PATENTED IN

AMERICA, ENGLAND, AND FRANCE.

THE OUTER SURFACE of the sole of these Boots and Shoes, PROPERLY MADE, is as flat transversely, beneath the ball of the foot, as the floor or sidewalk upon which they are designed to tread, while the upper surface is irregularly concavo-convex, the counterpart of the sole of the undistorted foot, to which it is intended nicely to coapt, preserving the natural integrity of the foot, and preventing the distortion known to surgeons as "the depression of the Metatarso-Phalangeal, or transverse arch."

The accompanying "Patent Stamp," four times enlarged, is on one of each pair of genuine manufacture, and in ready made goods the *manufacturer's name* attached, is a guaranty of honest effort to thoroughly embody the principles of my invention.

J. C. PLUMER.

PART FIRST (2D EDITION)

Is a compilation from various eminent surgical authorities relative to injuries and distortions of the human foot, the majority of which are of a purely mechanical nature and origin, and directly produced by the use of badly constructed Boots and Shoes.

With the exception of italicizing some important sentences, and the introduction of Figs. 1, 2, and 3, from my own cabinet of casts, no departure of importance has been made from the original text.

J. C. PLUMER.

BOSTON, April 5, 1862.

SURGERY OF THE HUMAN FOOT.

CLINICAL LECTURES ON SURGERY.

DELIVERED AT ST. GEORGE'S HOSPITAL, BY SIR BENJAMIN G. BRODIE,
BART., V. P. R. S.,

Sergeant-Surgeon to the Queen; Surgeon in ordinary to his Royal Highness Prince Albert, etc., etc

CHAPTER XIV.

ON CORNS AND BUNIONS.

"It cannot be doubted that the physical condition of man is, on the whole much improved by civilization; but it is not so in all respects, and the usages of society are productive of some evil, combined with much good. The evil affects the weaker more than it does the stronger sex; and among the former, those who belong to what are called the higher classes, suffer more than those who belong to the lower. Young ladies, living much in heated rooms, taking little exercise in the fresh air, over educated as to the acquirement of accomplishments, and using their muscles too little, lose the beautiful figure with which they were endowed by nature, and become afflicted with curvatures of the spine, and weakness and *distortion of the ankles*. (Fig. 5, part 1st, and 15 to 27 inc. part 2d).

"There is another order of diseases which we meet with more frequently among females of the higher classes than among other persons — namely, *corns and bunions*; and it is to this last humble, but not unimportant subject, that I propose to call your attention in the present lecture.

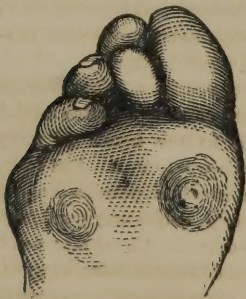
"A corn is in the first instance a thickening of the cuticle. Whenever the cutis is habitually subjected to the influence of pressure, it secretes a thick and horny cuticle. We find examples of this in the hands of many mechanics, and in the soles of the feet in those who walk much. But every thickening of the cuticle is not a corn, and this name is applicable only to those cases in which the cuticle is thickened over a projecting portion of bone, on which the pressure is, as it were, concentrated. Corns may occur in any part of the body in which this combination of circumstances exists; but, for obvious reasons, they are met with in the feet much more commonly than anywhere else. * * * * *

"In some cases a hard corn is formed on the lower surface of the foot, over the metatarsal bones. A corn in this situation is especially trouble-

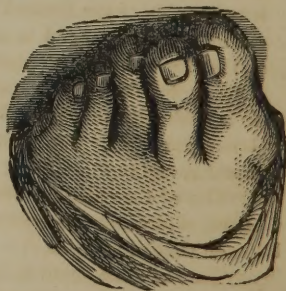
some, rendering the patient absolutely lame. * * * (Fig. 1, part 1st and 11, part 2d).

“If shoes were constructed of the *shape of the human foot*, neither too large nor too small, and making an equal pressure everywhere, corns and bunions of the feet would never exist. But, unfortunately, shoes are seldom made after this fashion, and in ladies’ shoes especially there are generally two signal defects: first, the *extremity of the shoe is much too narrow for that part of the foot* (namely, the toes) which it is to contain; and, secondly, for the purpose of displaying as much of the foot as possible, the whole of the tarsus and metatarsus is left uncovered, and the pressure of the shoe in front is thrown entirely upon the toes. The toes are thus first squeezed against each other, and then pushed out of their natural position; and all the projecting points, chiefly where the joints are situated, are pinched and tormented either by the neighboring toes or by the leather of the shoe, and thus it is that corns of the feet are generated.

“In order that you should understand the precise situations in which corns are most likely to take place, you must consider more particularly the effects which the pressure of *the shoe produces on the toes*. The little toe is pushed from its parallel position, so that it is in fact underneath the fourth or adjoining toe, and corns are generated on its outer surface over the prominences of its joints. A corn is also frequently met with in the angle between the little toe and the next toe, where the first phalanx of the former is pressed against the head of the metatarsal bone supporting the latter. Sometimes the consequence of wearing a very narrow shoe is, that one of the toes [and it is generally the second or fore toe] is pushed upwards, so that it lies over the two adjoining toes, that is, over the great toe and the third toe, the extremities of which come in contact underneath [See Figs. 1 and 2]; then the leather of the shoe is drawn tight over the upper surface of the second or displaced toe, and corns are produced over one or more of its articulations. [See Fig. 2].



[Fig. 1.]



[Fig. 2.]

“At other times one of the toes [and in this case also it is generally the second toe], is displaced in another way. The extremity of it is pushed downwards, so that it lies beneath the extremities of the two adjoining toes

which come in contact over it. [Fig. 1]. But this change cannot take place while the three phalanges of the displaced toe remain in a line with each other. The first and second phalanx make an angle *projecting upwards*. The second joint of the toe becomes prominent above, and a **corn** is formed over it. (Fig. 3).



[Fig. 3.]

“ If the shoe, instead of being too narrow, be too short for the foot which it contains, the last phalanges of all the smaller toes are kept constantly in a half-bent state, and a row of corns is generated, one being situated on the upper part of the last joint of each of these toes. I have endeavored to enumerate what may be regarded as the most ordinary localities of corns; but of course they may be produced anywhere else, according to the shape of the shoe, the mode of walking, and other circumstances. * * * *

“ With a view to a *permanent cure*, in some way or other all undue pressure must be removed from the part on which the corn is situated. *First*, the shoe must be made as nearly as possible to the *shape of the foot*, and it must cover the metatarsus and a portion of the tarsus, so that the whole pressure may not be thrown on the toes; or a boot made to be *laced or buttoned* may be worn instead of a shoe. In some cases it is advisable that the shoe or boot should be made, not of ordinary leather, but of very soft and flexible buckskin or cloth. * * * *

“ The first thing to be done for the permanent cure of a soft corn is, that the patient should be provided with a shoe of a proper shape, and that the toes which are in any way displaced should be brought back into their proper position.

“ The **BUNION**, which is frequently formed on the inside of the ball (as it is called) of the great toe, differs in some respects from the disease of which I have hitherto spoken.

“ The great toe ought to be in a line with the metatarsal bone, by which it is supported. But a shoe which is too narrow at its extremity, causes it to incline towards the outside, displacing, in a greater or less degree, the toe next to it, as I have explained already. (Fig. 4, pt. 2d). In some cases, the effect of the pressure on the great toe is actually to *alter the position of the*

joint between it and the metatarsal bone ; a portion of the articulating surface on the extremity of the latter being absorbed, and a new articulating surface being made to supply its place more externally than the old one. The existence of these changes I have ascertained by dissection. Now, the consequence of all this is, that the head of the metatarsal bone makes an unnatural prominence, and is more acted on by the pressure of the shoe than it would be otherwise. The cuticle becomes thickened, not at one particular point, but over a considerable surface, and underneath the skin a large and very distinct bursa is generated between it and the bone. The difference between what I have now described and a common corn, may reasonably be attributed to the large size of the head of the first metatarsal bone, and to the consequent diffusion of the pressure over a broad surface.

“ When a bunion is once formed, the bursa belonging to it is liable to become inflamed after any unusual degree of exercise, or on its being subjected to the pressure of a more than commonly tight shoe. * * *

* * * If, however, he continues to walk about, wearing at the same time a tight shoe, the inflammation proceeds further ; suppuration takes place, and an abscess is formed. Such an abscess is slow in reaching the surface, and the patient generally suffers severely before it bursts externally ; and when it has burst, as the synovial membrane of the bursa granulates with difficulty, the healing of the abscess is very tedious, the parts remaining all the time in a very irritable and painful state.

“ For the relief of this bunion, when it is free from inflammation, or inflamed only in a slight degree, the following plan of treatment should be adopted :—the patient should be supplied with a *shoe of sufficient dimensions, of a proper shape*, and made of cloth or a soft and pliant leather. * *

“ A tumor is occasionally formed on the instep, which, though not exactly a corn, bears a near relation to it. It is met with in *young men who wear tight boots*, and the usual situation of it is over the articulation, between the internal cuneiform bone and the metatarsal bone of the great toe. The tumor is under the skin, hard and immovable, so that it seems to a superficial observer to be an enlargement of the bone itself. The skin over it is in a natural state, except in cases of long standing, in which the cuticle becomes somewhat thickened. * * * * *

“ Such a tumor is productive to the patient of as much inconvenience as a corn, and it requires the same kind of treatment. He should, for a time, *leave off boots altogether* or if he cannot do this, the boot-maker should be directed to provide a last with a projection in that part of it which corresponds to the situation of the tumor, so that the boot may not exercise any pressure on it. A piece of thick buckskin leather, with a hole in it to receive the tumor, will also give the patient immediate relief, and ultimately effect a cure ; but the cure, of course, will not be permanent, if he continues to wear *tight boots* afterwards.”

THE SCIENCE AND ART OF SURGERY.

BY JOHN ERICHSEN,

Professor of Surgery and of Clinical Surgery in University College, and Surgeon to University College Hospital. 1860.

“When the bursa that lies towards the plantar surface of the head of the metatarsal bone of the great toe becomes enlarged, or when a new serous sack is formed upon the inner and posterior aspect of this bone the disease termed BUNION occurs. In this affection the enlargement of the bursa is usually secondary to an *alteration in the shape and position of the great toe, which, in consequence of the pressure of narrow, pointed boots, has been thrown outwards, in an oblique direction, so as to lie over or under some of the contiguous digits.* (Fig. 4, part 1st, and Fig 4, part 2d).



[Fig. 4.]

“In this way a sharp angle is formed at the junction between the first phalanx and the metatarsal bone of the great toe. This angle being constantly pressed upon by the boot, becomes irritated, and for its protection, the bursa that is there naturally situated becomes enlarged, or an adventitious one forms. From time to time the bursa and the projecting angle become irritated and inflamed; and the morbid action thus set up may run on to a suppuration of a very troublesome kind, a thin, unhealthy pus being formed, which is discharged through an opening that speedily becomes fistulous, and may degenerate into a most troublesome, indolent sore. * *

“In the treatment of the affection, the first thing to be done is to *change the direction of the toe by wearing properly shaped boots.*” * * * (Figs. 1 to 4, part 2d).

FLAT OR SPLAY FOOT. [Fig. 5.]

“In it there is a tendency, in the first instance, to the obliteration of the arch of the instep, so that the sole becomes perfectly flattened; and as the disease advances, a tendency to eversion of the foot usually takes place. When it has advanced to this extent, the toes and anterior part are often somewhat raised. * * * (Figs. 15 to 27, part 2d.)



[Fig. 5.]

"In this kind of deformity, the ligaments of the sole of the foot, which bind the bones together so as to form the arch, are weakened and elongated." *

* * * (Figs. 15 to 27, part 2d).

A SYSTEM OF PRACTICAL SURGERY.

BY WILLIAM FURGERSON, F. R. S. E.,

Professor of Surgery in King's College, London; Surgeon to King's College Hospital, etc., etc., 1843.

"The great toe and its metatarsal bone are liable to a kind of displacement of a *slow and gradual character*, constituting a condition whose real nature has occasionally been overlooked. The disease is termed "*bunion*." In some individuals the distal extremities of the metatarsal bones have a considerable tendency to separate from each other; and as more latitude of movement is permitted on the outer and inner margin of the foot than in the other bones, any inconvenience which may result therefrom is experienced in these situations. The distal extremity of the metatarsal bone of the little toe is occasionally somewhat prominent, but seldom causes much inconvenience; in the great toe, however, the spreading out of the foot causes the end of the metatarsal bone to appear so prominent, that this condition is often mistaken for an organized tumor on the inside of the articulation. The swelling is occasioned almost solely by the end of the metatarsal bone, whose projection inwards is rendered conspicuous by displacement of the toe itself, which slopes off from the metatarsal bone towards the other toes, so as to make the distortion more prominent. The feet of the female opera-dancer are always distorted in this way; the displacement being, doubtless, occasioned by the frequent habit of poisoning the body on this member, and thus producing a '*fantastic toe*,' of a very different description from that to which the phrase usually has reference. The skin over the projection is generally thinner than in the natural condi-

tion, the internal lateral ligament more elongated, and in some instances the head of the bone is enlarged; it occasionally happens, however, more particularly during inflammation of the surface, — a condition to which it is remarkably subject, in consequence of pressure, — that the soft parts actually seem to be thicker than in the natural state. The inflammation may be in the skin only; it may, however, extend to the joint, or in some instances its effects may be most conspicuous in a bursa, which is sometimes present in this situation. The disease is exceedingly troublesome, more particularly if ulceration is present, — an event which is by no means unusual, — for then even the slightest pressure [which is at all times annoying] cannot be borne; but unless the joint becomes permanently affected, no active surgical means beyond those usually adopted in local inflammations are required; rest and horizontal position will be of the utmost consequence if the latter disease be in a state of activity, and under ordinary circumstances, a *shoe made of soft upper leather, and so constructed as to save the part from pressure, should always be worn*; no further special instructions seem necessary here, and I will therefore only caution the young surgeon not to mistake a swelling of this kind for a tumor of another character, and resort to an operation for its removal, which will reflect great discredit on his professional character.”

The drawing exhibits an example of the kind of swelling referred to.



[Fig. 6. Also Figs. 1 to 5, part 2d.]

“The tumor in this case was slightly inflamed, but there was no ulceration present. There are few feet where such a projection is not more or less conspicuous, and that here exhibited is below the average size of what is so familiarly known under the title of *BUNION*, it seems, therefore, sufficiently strange that the true nature of the disease should ever be mistaken; for in many instances the skin over the end of the metatarsal bone is actually so thin as to permit the outline of its shape to be most distinctly felt, when the fingers are placed over the part.

“The phalanges of the toes are liable to various forms of displacement and distortion, from the *pressure of overtight shoes* for which no remedy but that of *avoiding the cause* will be of any avail; indeed, in most instances the cause is overlooked, and continued until its *avoidance will not be of much benefit*. One of the most troublesome displacements caused in this way is that when the toe next the great one forms a *sharp angle upwards*,

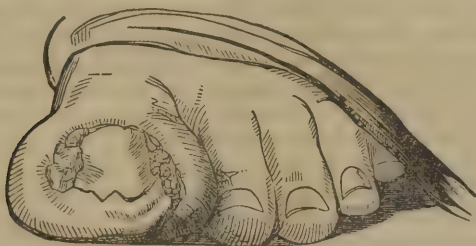
and the skin over it becomes affected with a corn, which is even more troublesome in this situation than on other parts. [See Fig. 3.] The projection is usually seen at the junction between the two proximal phalanges; it seems to occur most frequently in the originally well-formed foot, in which this toe is a little longer than the others; and though I believe that a short toe is generally the cause of the displacement, I imagine that there is a natural tendency to it from the slender shape of the part and the influence of the flexor and extensor muscles. The latter seems to draw the distal extremity of the first phalanx upwards and backwards, whilst the former apparently have most effect on the furthest end of the toe, and by drawing it downwards, increase the displacement. It is seldom that the surgeon is consulted in cases of this kind; the operation of dividing the flexor tendons immediately under, has been proposed, and I believe the anticipated results might be greatly facilitated were the extensors also cut across above the root of the toe. By using a small knife, such as that afterwards depicted, and taking care to avoid the joints, no danger can result from such operations. Two months ago I was consulted in a case of this kind, which the patient himself [a legal gentleman] considered congenital, his father's foot being affected in a similar manner. I divided the flexor tendons, with the knife referred to, immediately under the proximal phalanx, put a small piece of wood below the toes, and with some turns of a narrow slip of adhesive plaster kept the two united, when in a few days, the part was as straight as that on the other foot, and the cure was complete. Sir Astley Cooper refers to a case of a similar kind. The greatest trouble with the toe in this condition is commonly from the *pressure of the upper leather upon the shoe*; but I have seen the part so much bent under the foot, that the patient requested amputation of the offending member, which was accordingly performed. * * * * *

“The surgeon may find it necessary to remove a portion of the nail of the great toe for incurable ulceration at its root and margin. When in this painful form of ulceration [onychia — as it is sometimes called] [Fig. 7] it is found that the usual ointments and lotions with the occasional application of lunar caustic, produce no benefit, there should be little hesitation about removing a portion or the whole of the nail, as may be required, and the proceeding may be accomplished thus:—one blade of the scissors should be thrust upwards between the nail and the soft parts as far as the root [matrix], and then by closing the instrument, the nail is split longitudinally, when with strong, rough-pointed forceps the free end of the part should be seized, and by a twist towards the back of the toe, its removal will be effected; next, if it is necessary, the other half may be twisted in the same manner.”

ELEMENTS OF SURGERY.

BY ROBERT LISTON,

Surgeon to the North London Hospital, Professor of Chemical Surgery, etc., etc. 1842.



[Fig. 7. Also Fig. 3, part 2d.]

“The term *Onychia* is sometimes, and not without good reason, designated *maligna*; it is applied to ulceration about the nail.—Some of such sores are small, and not indisposed to heal; others are very obstinate. They occur at all periods of life, frequently during infancy. They usually commence in a small and irritable tumor, or granulation by the side of the nail, or at its root, with swelling and redness around. This may follow bruises or laceration and removal of the nail, extravasation under it, and various injuries of the part. The disease is also met with in the toes, most frequently the great one, causing much lameness; then it is generally owing to the *pressure of tight shoes*. In many cases the ulceration is extensive, shreds of the nail projecting through the angry surface; there is considerable loss of substance; the discharge is thin, bloody, acrid, and abominably fetid; the edges of the sore are jagged, and the integuments around are of either a bright or dark red, according to the state of the disease. Sometimes the bone is exposed and involved in ulceration; or, instead of having lost substance, it is found of an unusually spongy and open texture, and with recent osseous matter superadded. A violent burning pain attends the disease when advanced; the absorbents are irritated and inflamed, and the glands enlarge along their course. The general health is often impaired in consequence; frequently the disease occurs in those of broken-up constitution, along with sores and eruptions on other parts of the surface, ulcerations of the mucous membranes, and other indications of cachexia.

“By judicious exhibition of purgatives, anti-bilious medicines, and preparations of sarsaparilla, and by regulation of diet, the general health may be improved. The edge of the nail, when in contact with the ulcerated surface, must be removed—more especially when the *great toe* is affected; not that any undue growth is the cause of the disease, but because the sore, pressing on the sharp edge, produces much pain, and keeps up the morbid action.—About one third in breadth of the nail should be taken away; one blade of strong and sharp-pointed scissors is passed along beneath the nail as far as its root, and by rapid approximation of the other blade the part is

divided; the isolated portion is then laid hold of by dissecting forceps, or small, flat-mouthed pliers, and pulled away by the root. This should be performed as quickly as possible, for the operation, though trifling, is attended with most acute pain; it is quite effectual, the relief is great, and almost immediate. The nail may also be removed by scraping and paring; but this method is not so effectual as the preceding, and almost equally painful. Afterwards the best application to the ulcerated surface, as to other irritable sores, is the nitrate of silver, either used solid and followed by poultice, or employed in the form of lotion. The remedy is almost specific; very few cases prove obstinate under it. Sometimes it may be of advantage to alternate it with black wash. In protracted and unyielding cases, removal of the whole matrix of the nail has been proposed; the dissection is painful and tedious, and its efficacy doubtful. When the sore is of a weak character, discharging glairy secretion, studded with soft flabby granulations, connected with unsoundness of the neighboring cellular tissue, surrounded by undermined integument, and by considerable boggy, soft swelling, free application of the caustic potash is highly beneficial. When the bone is denuded, and involved in ulceration, the phalanx should be amputated.

“When the extremity of the metatarsal bone of the great toe is large, and consequently the *seat of pressure*, a bursal formation is produced in the soft parts covering it; this from increase of pressure, or other irritation, may inflame — forming the painful and troublesome disease termed *Bunion*. Sometimes unhealthy abscess occurs, with thickening, infiltration, and condensation of the surrounding cellular tissue; in such cases incision and poultice are required, and occasionally it is necessary to destroy the unsound cellular tissue and the degenerated cyst by free application of the caustic potash.” (*Figs. 4 and 6. Also Figs. 1 and 4, part 2d*).

A TREATISE ON DISLOCATIONS AND FRACTURES OF THE JOINTS.

BY SIR ASTLEY COOPER, BART., F. R. S.,

Sergeant-Surgeon to the King, etc. 1851.

“DISLOCATION FROM CONTRACTION OF THE TENDON. — A toe is sometimes gradually thrown out of its natural direction, by a contraction of the extensor tendon and theca; and the first and second phalanges are consequently drawn up and projected against the shoe, so as to prevent the patient from being able to take his usual exercise. [*See Fig. 3.*]

“I have frequently seen young ladies subject to this inconvenience in the toe, and attribute it to the *tightness of their shoes*; it appears an extremely harsh measure on the part of the surgeon, to amputate a toe under such circumstances; yet it is sometimes absolutely necessary, as the contraction deprives the person of exercise, and of many of the enjoyments of life. In the first person I saw with this state of the toe, I refused to amputate, fearful of tetanus being produced by the operation; but the lady went to another

surgeon, who complied with her request, and she did very well. In consequence of the perfect recovery of this lady, and the comfort she derived from the loss of the annoyance, I was induced, at the request of Mr. Toulmin, of Hackney, to remove from Miss T., a patient of his, one of her toes, which was constantly irritated by the pressure of her shoe in walking, and prevented her from taking the exercise necessary to the preservation of her health; she did very well, perfectly recovering the use of her foot."

PRINCIPLES AND PRACTICE OF MODERN SURGERY.

BY ROBERT DRUIT,

Fellow of the Royal College of Surgeons. 1852.

"WEAK ANKLES. In this affection the *foot is flattened, its arch is sunk*, and the astragalus forms a projection below the internal malleolus, rendering the internal border of the *foot convex instead of concave*. (*Fig. 5.*) In bad cases the inner ankle almost touches the ground, and the patient walks with great pain and lameness. This affection depends on a weakness and relaxation of the *bones and ligaments*. It is sure to be brought on, if weakly children are put upon their legs too soon. It is more common amongst girls than boys — partly from their greater delicacy — partly because they are taught at an earlier age by ignorant governesses and dancing masters, that it is necessary for them to turn their feet out as much as possible, as the very first step towards elegance in dancing or walking. Thirty years ago it was a common practice to make school girls sit for an hour every day in a kind of stocks, with their feet turned outwards, so as to be almost in a straight line with each other.

"Treatment. — The patient should wear *shoes or boots with high heels*, and with the inner edge of the sole much thicker than the outer. He should also be directed to turn the foot out very little, if at all. Benefit may also be derived from a well applied bandage. It should always be applied so as to be carried round the ankle from the inner side of the foot. In severe cases the patient should wear a tightly-fitting boot with a piece of steel or whalebone fastened to the sole and passing perpendicularly upwards to the middle of the inner side of the leg.

"CONTRACTION OF THE TOES. — It often happens that one of the toes is permanently elevated, and rides over its neighbors, from the habitual use of *narrow boots* (*See Figs. 1 and 2*); and the upper surface of this toe being peculiarly exposed to friction, is generally covered with corns so painful that many persons have been compelled to have the part amputated. Division of the extensor tendon may, however, enable the toe to be brought down into its place, and prevent the necessity of its removal.

"BUNION. — A bunion signifies a *distortion* of the metatarsal joint of the *great toe*; which is thrown outwards, so that the head of the metatarsal bone projects, and forms a swelling on the inner side of the foot. The skin

covering it is generally very thin; sometimes, however, thickened from inflammation, or from the development of a bursa underneath. *This affection is produced, partly by the use of tight boots, which cramp the toes together, and force the great toe outwards, in order to make the foot fashionably pointed; — and it is partly a consequence, as Mr. Key has shown, of a weak flattened state of the foot, which throws the extremity of that metatarsal bone forward, and the toe outwards.* The ligaments of the joints are thus stretched and thickened, the joint is rendered unnaturally prominent, and subjected to pressure and friction, a bursa forms over it, and there is a constant state of tenderness and pain, subject to fits of inflammation. (See Figs. 4 and 6, and Figs. 15 to 27, part 2d.)

“*Treatment.* — The patient must wear *proper shoes*, so arranged as not to press on the tender part. Mr. Key recommends the great toe to be kept in its proper place by means of a partition in the stocking, like the finger of a glove, and a partition of strong cow’s leather fixed in the sole of the shoe. But it is almost an impossibility for a person who walks about to use such contrivances. A mercurial plaster on soft leather often gives great comfort. If the bursa inflame, it must be treated by rest, leeches, and poultices, in order to avoid suppuration and the necessity of a puncture, which is sure to lead to an inveterate fistula; for which, Mr. Key says, that a weak solution of creosote is the best application.

“*ULCERS ABOUT THE NAILS.* — A very common and troublesome affection is that which is popularly termed “*the growth of the nail into the flesh,*” and which most usually occurs by the side of the great toe. It does not, however, arise from any alteration in the nail, as its name would imply, but the contiguous soft parts are first swelled and inflamed by constant pressure against its edge, from the use of *tight shoes*. If this state be permitted to increase, suppuration occurs, and an ulcer is formed with fungous and exquisitely tender granulations, in which the edge of the nail is embedded, and which often produces so much pain as totally to prevent walking. (See Fig. 7.)

“*Treatment.* — The objects are, to remove the irritation caused by the nail, and reduce the swelling of the soft parts. In most cases, if the nail, having been well softened by soaking in warm water, is shaved as thin as possible with a knife, or file or bit of glass, the pain and irritation may easily be allayed by rest for a day or two, with fomentations and poultices; and then any ulcer that has formed will soon heal, with the aid of black wash or lint, or a touch of lunar caustic, or a lotion of a grain of sulphate of copper to an ounce of distilled water. But if the case is more obstinate, the edge of the nail must be removed. This frightfully painful operation may be done by passing the sharp blade of a pair of scissors resolutely under the nail, cutting it through, and then quickly tearing away the offending portion with forceps. If the complaint return after this, the whole nail had better be dissected out, together with the gland that secretes it. Persons disposed to this affection should wear *loose shoes*, and keep their nails scraped rather thin, so that they may be flexible.”

THE MECHANICAL DISTORTIONS OF THE HUMAN FOOT; THEIR PREVENTION AND REMEDIES.

BY J. C. PLUMER, M. D., BOSTON

From the almost universally distorted condition of the adult human foot, it is evident that the very important subject of a proper *foot covering* has been too long confided, either to a class of persons who regard the boot or shoe only as an article of merchandise, the "*manufacturer*," or to individual measure workmen (so called "*custom makers*"), too generally the most essentially uneducated and unthinking of all classes of artisans.

With the *manufacturer*, remarkable as it may appear, it is customary to prepare the "*upper*" of a boot, or shoe more particularly with reference to *economy of material*; so that a given amount of surface of leather will "*cut*" the greatest number of "*uppers*." This done, the next step is so to fashion a block of wood, the *LAST*, that it shall, in the parlance of the trade, "*fit the stock*": that is, that the last *which is to give form* to the boot or shoe moulded upon it, shall be so far adapted to the *formless* "*upper*," as to require as little time and effort as possible, of the workmen in "*lasting*" the boot or shoe.

The result of this unscientific procedure is a *conical leather bag*. And fortunate would it be, not only for our feet, but health and well-being in many other respects, if these leather receptacles were as well adapted to their intended use as the wooden boxes in which they are thrown into the market. Instead of which, however, each boot or shoe thus produced is an instrument of torture, and too frequently of actual distortion, the effects of which no human fabric can withstand. And, after years of suffering in attempts at "*breaking in*" such absurd contrivances, till our feet are maimed and distorted, till "*ready-made*" boots are no longer endurable, we apply to the "*measure workman*," who at once remarks that "*Ye 'ave an odd foot*," "*ye 'ave an 'ard foot to fit*," and with gravity as mysterious as his ignorance of what he *ought* to do is palpable, he proceeds to "*fit the foot*." Here is a great mistake at the commencement. A foot already distorted by previously wearing badly-constructed boots, should *not* be "*fitted*" in the sense in which the shoemaker regards it. There is, of course, no impropriety in adapting the boot or shoe, in every particular, to the normal or *undistorted* foot; but if, through certain mechanical agencies, the foot has already become distorted, it is fair to suppose that by the same agencies, differently applied, such distortions may be prevented or corrected. No surgeon, after dividing the fasciæ and tendons in club foot, would make use of a shoe "*fitted to the foot*."

Inasmuch as shoemakers usually have no knowledge whatever of the

solid structure of the *normal* human foot, and especially as the majority of feet presented to the "measure workman" are already more or less distorted, so that he can have no idea of what the *form* of the natural foot *should be*, the proper course for both — manufacturer and "measure workman" — is, to adopt a model derived from a natural foot; and with reference to the accomplishment of this, the following suggestions and illustrations are presented.

Hitherto, evidently for *facility of manufacture*, it has been the *universal* custom to form the soles of boots and shoes upon a last having a transversely *convex* under surface. A vertical transverse section of such a last, at a point corresponding with the metatarso-phalangeal articulations, is represented in Fig. 1. This convexity produces a corresponding concavity upon the *upper* surface of the *boot-sole*, while the *under* or outer surface is convex, as represented in Fig. 2, a vertical transverse section of boot or shoe at the same point as in Fig. 1 — *s* the sole. This concave or guttering *sole* is diametrically opposed to the *naturally* concave *under* surface of this portion of the sole of the foot, as seen in Fig. 3, representing the combined

Fig. 1.



Fig. 2.



Fig. 3.



sections of the foot and shoe, at the same point indicated above. *B B B B B*, metatarsal bones. In this case the points of bearing and pressure of the foot upon the boot-sole are at the joints, *J J*, while the only bearing point of the sole upon the floor, *F F*, is at the central line *s*, the concave *sole* opposed to the concave under surface of the foot — forming an ellipsis, represented by the lines *l l* and *L L*. The immediate effect upon this portion of the foot, the transverse arch, of wearing soles so formed, is the production of painful callosities beneath the first and fifth joints, and a feeling of tension between them. The remote, but no less certain effect upon this portion of the foot, especially if of delicate construction, of attempting to "break in" desirably thick soles, is a *depression of the transverse arch*, formed by this row of joints, in which case this part of the foot becomes curved or rounded on the *under* surface. This affection I have frequently met with during the past three years, devoted exclusively to experiments and observations on pedal distortions.

Fig. 4 represents a vertical transverse section of the foot distorted as above, and its *unnatural* adjustment to the common concave sole, the distorting instrument. It will be observed in this figure, that the line *L L* is inverted and parallel with that of *l l*. Distortions of this nature to the degree indicated above are prevalent only among persons of about 60 years of age, arising, no doubt, from wearing fashionable shoes thirty or forty

Fig. 4.



years since, when the LAST used in their construction was extremely convex or rounded on the under surface, producing a sole with concavity in corresponding degree. In such instances this portion of the foot has become rigid and unyielding, and is ordinarily associated with subluxation of the great-toe joint, consequent, in a great degree, upon wearing the old style pointed shoe.

Individuals with this distortion are noticeable from a peculiar inelastic unsteadiness of gait, leaning forward with legs semi-flexed, shoulders drooping, and treading heavily upon the heels; pain and tenderness being indicated at every step. Walking being tedious, and locomotion accomplished only by a partial and constrained action of the muscular structure of the lower limbs, atrophy or a stunted development is an unavoidable consequence.

That these conditions of the feet and lower limbs, and their concomitant miseries, in the form of gout,* bunions, &c., may in all instances be prevented, and corrected in many already existing, by wearing a properly-constructed foot covering, is very evident, and the requirements are quite simple, and as follows: Let the longitudinal contour or outline of the last, upon which the boot or shoe is to be formed, represent the outline of the *foot in the position which it is to assume when in the boot*; and so long as all are determined to wear heels (of the propriety of which, or whether or not they are a necessity of civilization and pavements, we have at present nothing to say), this position will be with the *heel of the foot elevated*, hence

* The translator of Professor Meyer's pamphlet remarks in his preface: "There is one other subject of which I am anxious to say a few words; I refer to the remarks on gout, at page 16 of the text. In a country where gout is so common as in our own, these remarks will be apt to be passed over as entirely fanciful, and without attracting the attention they deserve. Nevertheless, it is certain that the almost universal occurrence of first attacks of gout in the joint at the ball of the great toe may be fairly attributable to the existence of a *locus minoris resistentie*. Boerhaave, Van Swieten, Sir Charles Scudamore, and many other more recent authorities, were fully aware of this; but no one urges it more strongly than Dr. Garrod, the latest and best authority on this disease, who, at page 49 of his excellent treatise (London, 1859,) says that, 'after accidents, and like causes, weakened parts are more susceptible to its influence,' and then mentions cases in which first attacks, instead of appearing in the usual seat, were limited to the knee or other parts that had suffered from previous injuries. At page 354, he remarks, that 'the metatarso-phalangeal joint is one which is subject to pressure and injury from having to support the weight of the body,' and he adds, thereby affording impartial evidence as to the evil effects of an improperly shaped shoe, that he has, in many individuals who had never experienced any symptoms of gout, 'very commonly found distinct evidence of injury on the surface of the cartilage, both of the head of the metatarsal bone and of the cup-like cavity of the phalanx.' All this clearly points to a weakened part, and the merit of our author is in directing attention to the true cause of its production, for the metatarso-phalangeal joint is *not*, as Dr. Garrod says, actually injured by having to support the weight of the body, but by its having to do so in a constrained and unnatural position."

The following are the remarks of Prof. Meyer, referred to above:—

"Not less important are the evils arising at the root of the great toe from the same

the "heel seat" of the *last* should be elevated to the same degree, and should also be *advanced* towards the ball portion of the last; in other words, the "*shank*" of the last should be shortened, which will produce a corresponding shortening in the shank of the boot. The mistake in measuring the foot in one position, *flat*, while it is to assume another when in the boot, *the heel elevated*, is clearly demonstrated by standing barefoot upon the floor with the heel pressed against an upright, and then, making the ball of the foot the fixed point, raising the heel sufficiently to introduce between it and the floor, a block of the thickness of an ordinary boot heel. The heel of the foot will *recede* from the upright, showing the measurement of an adult foot, from heel to ball, *less* by about half an inch than when the foot is resting flat upon the floor, or workman's "*size-stick*." A shoe-last formed upon this theory, will be considerably shorter from heel to ball portion, as also will the boot made upon it, which is important in its relation to the *longitudinal* arch of the foot, since it changes the position of the boot heel, advancing it more directly under the line of the TIBIA, relieving the arch from excessive strain.

In regard to that portion of the sole which is beneath the ball or palm of the foot, while it should be sufficiently thick to afford protection from the *roughness* of, and as *flat* transversely on the *outer* surface as, the *artificially* flat surfaces upon which we are accustomed to tread, let the *upper* surface of the sole be *concavo-convex*, so formed as to be the counterpart of, and adapt itself to the sole of the *undistorted* foot. There will be produced a firm and well-adjusted protection to the sole of the foot against the rough-and-uneven sidewalk, floor, or earth; in fine, a boot-sole which requires no "breaking in," and which therefore cannot distort the foot. A boot-sole thus formed, presents, when *new*, all the depressions, which are both obvious and palpable, upon the upper surface of one which has been worn for

cause. It has already been stated that the pressure of the upper leather pushes the point of the great toe against the smaller toes. The joint at the metatarsal bone thus becomes bent aside, so that it forms a protuberance on the inner side of the foot. If the point of the toe is now pressed against the ground in walking, this protuberance must be made still greater, and so pressed more forcibly against the upper leather. At the same time, moreover, the great transverse wrinkle in the upper leather—the result of the bending of the toes—presses directly on the same point; and the protuberance at the root of the toe is thus constantly subjected to a twofold and very injurious pressure. In these circumstances it is by no means wonderful that this joint becomes subject to continual inflammation, which, by extending to the bones, must, in this situation, produce permanent and painful swellings, which, become in their turn, and even from slight causes, the source of inflammations and new growths of bone.

"In this manner arise those unseemly and painful swellings at the root of the great toe, which, either from mistaking their true nature or from willful deception, are called *chilblains* or *gout*, just as the one or the other term appears the more interesting. In many cases, moreover, this kind of inflammation of the bones, and their investing membrane, may lead to the formation of matter, and eventually to the disease known as *caries* or *ulceration* of the bone.

"In connection with this I wish to explain, that I by no means desire to question the existence of such inflammations of this joint as are commonly attributed to *gout*; in by the far the greater number of cases, however, inflammation of the metatarsophalangeal joint of the great toe is traumatic, as above described; and even with regard to the occurrence of *gouty* inflammations, the causes above alluded to give an obvious reason for the formation, at the points indicated, of a *locus minoris resistentiæ*."

several weeks, and have been produced by the pressure of the under surface of the toe joints.

To secure a sole with the above characteristics, it is requisite that that portion of the last upon which it is formed should be directly opposed to that of those in common use. It should be *concave* on the bottom instead of *convex*, and the *form* and *degree* of concavity are *very important*. "It is not sufficient that the horse's shoe be *curved* instead of *square*, but it is important that the *curve* be adapted in *form* and *degree* to that of the hoof. Neither is it sufficient in making a shoe for the *human foot*, that the last on which it is fashioned be simply *concave on the under surface*, the *form* and *degree* of *concavity* are no less important to the production of a properly-

Fig. 5.



formed *sole*. Fig. 5 represents a vertical transverse section of a last properly formed at that portion corresponding to the "ball" of the foot. Fig. 6 represents a section, as above, of a properly-constructed sole from the last as above represented. "Fig. 7 represents a vertical transverse section

Fig. 6.

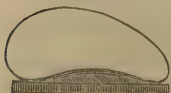


Fig. 7.



Fig. 8.



of the natural foot near the metatarso-phalangeal articulations, or *transverse arch*. B, bony structure; line *a a* show the arched form of this portion of the foot. Fig. 8 demonstrates the adaptation of the boot-sole (*s*), transversely convex on its upper surface, to this part of the undistorted foot, affording uniform support, and preventing callosities upon and distortion of the joints.

"It is neither requisite nor desirable that LASTS should be especially made for each individual. Different *styles* are made to represent the different styles of feet, from which an intelligent craftsman is expected to make a proper selection. The *styles* of feet are as susceptible of classification as those of *persons*, and there is no reason why a ready-made boot or shoe should not be as well adapted to its purpose as a ready-made coat."

TESTIMONIALS.

SCIENTIFIC

STATE ASSAYER'S OFFICE, }
Portland, June 15, 1860. }

To DR. J. PLUMER:

My Dear Sir:—Several months since, while in the pursuit of my official duties, I had occasion to call at your office. While there, my attention was attracted to sundry diagrams which I saw, and on inquiring their meaning, you explained them, and developed to my understanding an invention of great novelty, and which promised to confer a boon long sought after, but until this never discovered. This was no other than the Last as modified and improved by you, in accordance with an eminently philosophical principle. And when I came to comprehend the invention, it commended itself to my judgment as the only correct plan for the construction of a last, and the making of boots and shoes upon it. So thoroughly confident was I of its entire correctness, that I at once ordered a pair of lasts to be made upon the plan, as designed by you. And without awaiting the result of the experiment, I had my wife and her sister measured also for a pair of lasts each, making three several pairs. The shoes made upon these lasts were eminently satisfactory. In my own case they were worn with entire ease and comfort, during a recent journey to Washington, and during my stay there and at Baltimore, I walked several miles a day with less fatigue than I ever remember having experienced on walks of similar lengths before. My wife wore her boots with the greatest comfort, and on temporarily returning to the old style of ladies' boots, was astonished at the difference she found between the new and the old. Her sister, who had always been obliged to buy shoes several sizes too long in order to get those she could wear, at length got a boot which fitted her foot, and reduced it to genteel dimensions. In summing up the advantages of the last, or the shoes or boots made upon it, the following appear to me, evident from my own experience and observation:

1. An accurate and easy fit.
2. The lines of the last conforming to those bounding the skeleton of a well-formed foot, must prevent deformities and appreciably correct them when present.
3. The natural arches of the foot are properly supported, and their development is favored so as to produce a firm and elastic tread.
4. The heel being provided with a hollow seat, where it is firmly set, the foot has not a tendency to slide forward in the shoe or boot, producing pressure upon the nail of the great toe, and a liability to the painful disease known as "ingrowing nail."
5. No doubt exists in my own mind that some forms of lameness, dependent upon abnormal tension of the ligaments and tissues in the tarsal arch may be effectually relieved by wearing shoes made upon the last as improved by you.

And further experience will no doubt develop further advantages.

In conclusion I would say, that I have reason to believe that the principle suggested to your mind and followed out by careful and patient reasoning and experiment has now for the first time, been **PRACTICALLY AND FULLY DEVELOPED AND APPLIED**. It consists, as I understand, in conforming the outline of the last to the contour of the osseous ligamentous tissues of a well-formed and developed foot, bringing the point of support more directly in the long axis of the body and limbs, diminishing the amount of leather employed in a shoe to the minimum necessary, and conferring advantages which can be most sensibly appreciated by those who suffer from tender feet.

That you may reap an abundant reward for your careful study and ingenuity is my earnest wish.

Yours very cordially,
H. T. CUMMINGS, M. D.,
Assayer to the State of Maine.

PORTLAND, June 15, 1860.

MR. D. ROBINSON, JR.:

I have worn with great satisfaction and comfort, the boots furnished by you, and made upon the "Patent Last." They were more comfortable to my feet the *first time I put them on*, than a nice pair of boots, made upon the common form of last, which I have been wearing for several months.

It seems to me that the invention of Dr. Plumer is as valuable as it is novel. Based upon principles entirely scientific, and applied in a manner quite original, I think his services to the public should be highly appreciated and in some way handsomely rewarded.

Very truly yours,
ISRAEL T. DANA, M. D.

MR. D. ROBINSON, JR.:

Dear Sir— I am happy to say that the boots made for me several weeks since at your establishment, on the "Patent Lasts" of Dr. Plumer, are the most comfortable I have ever worn.

Yours truly,

S. FITCH, M. D.

Portland, Oct. 5, 1860.

PORTLAND, NOV. 23, 1860.

J. C. PLUMER, M. D.:

Dear Sir:— It gives me pleasure to add my individual testimony to that of many friends and acquaintances, in regard to your "Patent Last."

Many inventions, which *theorize* beautifully, fall lamentably short in the *practical application*. This discovery is only exceeded in the breadth and strict truth of its scientific basis by the thoroughness and success of its practical application; and, indeed, as in the old legend of Columbus and the egg, we only wonder that nobody did it before.

It seems to me that a *fair trial* of this last is all that is necessary to convince the most skeptical of its immeasurable superiority to everything in this line that has preceded it.

Truly yours,

CHAS. W. THOMAS, M. D.

PORTLAND, ME., November 23, 1860.

Dear Doctor:— Thank you for your pamphlet on the "Mechanics of the Human Foot." The diagrams are, in a great measure, new to me, and they are very beautiful and very truthful.

Anatomists have long admired the skeleton of the foot, and surgeons have carefully analyzed the principles of its construction and the relation of its parts in order, to remedy its frequent distortions and diseases induced by fashionable boots and shoes.

But the idea of conforming the Last to the solid structure of the foot upon the principles of exact science, (unquestionably originated by yourself,) is destined to revolutionize completely the art of boot making, and elevate it, if not to the rank of the fine arts, at least to that of the finest decorative arts.

The important changes you have instituted in the construction of the Last, are calculated not only to avert the evils named above, but by preserving the integrity of the arches of the foot will eminently develop its beauty, strength, elasticity — and these results will induce many to walk much in the open air, who seldom walked before, especially the ladies, and thus an important means of health will become attractive, interesting, fashionable, and consequently universal.

I have had another pair of boots made on the "Patent Lasts" and shall probably never again habitually wear any other kind.

I formerly remembered my Edinburgh shoes with which I walked over the Highlands of Scotland as most comfortable, and the boots made for me in Paris as very beautiful, but those made upon the "Patent Lasts" are alone perfect; and with sentiments of real gratitude for the benefits of your invention, I remain,

Yours very truly,

S. FITCH, M. D.

Dr. J. C. PLUMER.

PORTLAND, NOV. 24, 1860.

DR. C. PLUMER:

Dear Sir:— I have been perusing your little book upon the "Mechanics' Mechanical Anatomy, and Mechanical Distortions of the Bony Structure of the Human Foot." By the aid of such numerous and ingenious diagrams, you have made the exposition interesting, clear, and conclusive.

I think you cannot fail to reach the *understandings* of the people.

You make your "Patent Last" do what the common last does not begin to do, viz: *correspond to the natural contour of the solid structure of the foot*. Notwithstanding that my feet had so often *ached* in testimony to the fact that new boots even "made to order" upon the old last, would not fit, I would not have believed that the old form of last could be so faulty as the comparison of it with the new has demonstrated it to be.

The *principle* of the "Patent Last" commends itself wholly to my judgment, and I believe it to be as novel as it is excellent.

Boots and shoes made upon it are calculated to *preserve* the natural arches of the foot, upon which the facility of standing and walking largely depend, while the use of those made upon the old plan tends to *break them down*. I examined the foot of a gentleman yesterday, in whose case the arches had been thus destroyed, and who suffers greatly in consequence. He might have escaped this misfortune had your invention been made fifty years ago. It may do something now to correct the deformity.

It makes the wearing of *thick soles* comfortable to ladies, who have heretofore rejected them to the great detriment of their health.

Boots made upon your Last exert an *equable pressure* upon all parts of the foot, and so must tend to prevent the local congestions and tumefactions so common and so painful, and so often leading to results yet more unfortunate.

A personal *experience* has fully realized high expectations on my part, and such is the universal testimony I have heard from others.

Very truly yours,
ISRAEL T. DANA, M. D.

PORTLAND, December 7, 1860.

Dear Doctor:—Permit me to give you my experience in the use of the "Patent Last." Since childhood I have suffered from weakness of the ankles, and flattening of the foot, much aggravated by a recent attack of rheumatism, that left the ligaments so sore as to render walking extremely painful, even in boots which I have worn so long as to fit them as perfectly to the feet as it is possible for boots made on the old last. In this condition I tried a pair of shoes constructed on the "Patent Last." I was able to walk in them with the utmost ease. The peculiar form of the sole and heel afforded that support to the plantar arch which it had always needed, and in a short time my feet were in a better condition than they had ever been before.

I most cordially and gratefully acknowledge the benefit which I have received from their use, and shall take every possible occasion to recommend the "Patent Last" to all who, from any cause, find it difficult to get well fitting and easy boots, certain that, after a sufficient trial, they will agree with me in the belief that it is one of the most valuable and useful inventions of the times. I do not hesitate to predict that it will entirely supercede the use of the old last in no great length of time.

Yours very truly,

W. R. RICHARDSON, M. D., *City Physician,*
Now in the U. S. Navy.

J. C. PLUMER, M. D.

PORTLAND, Dec. 12, 1860.

My Dear Doctor: I received in due season the pair of boots made on your "Patent Last," and cheerfully add my testimony as to the exceeding value of your invention. It is not a little singular that while the most eminent surgeons have devoted a good deal of attention to the subject of corns and bunions, as well as the more serious distortions of the foot produced by badly-made and ill-fitting boots and shoes—no one has gone to the root of the evil, by suggesting the necessary alterations and modifications of the common last, until you turned your attention to the subject; although Prof. Meyer, of Zurich, seems to have given his attention to it almost simultaneously. That the alterations made by you are entirely novel, I presume, admits of no doubt; and that they are made on thoroughly scientific principles is equally unquestionable. The real wonder is, that these alterations have never been made before, with all the suffering and deformity that the world has felt, and surgeons so often seen, from injured and distorted feet.

If any one were asked how a last should be constructed on which to make a shoe that should the most perfectly fit a human foot, it would seem as if there could be but one answer—"to make it in the form of the more solid structure of the foot." Yet in the ordinary last, the form is, in its most essential parts, diametrically the reverse. As a natural consequence, when the shoe is made it has to be worn in discomfort, until the foot itself is has pressed it into the shape that should have been originally given it by the last. If the foot be perfectly sound, this may be done without much injury. But in the vast majority of cases, it is in reality accomplished only by a serious injury to the foot; and corns, bunions, callosities, and deformities are the almost inevitable result. All this, I believe, is entirely remedied by your "Patent Last," and in addition to all this, a most important improvement is added, by throwing the weight of the body where the conformation of the foot plainly shows it was intended by the Creator to be borne.

That those who have suffered from injured and distorted feet will at once avail themselves, and with great comfort, of your excellent Last, I cannot doubt. And to all, it seems to me equally important. To the young—to children—where feet are forming as they grow, it is of no less value; allowing them to take all necessary exercise and preserving and developing the natural form and proportions of the foot. To ladies especially, whose health is so dependent on regular exercise, it is of unquestionable value. For them—in our climate—thick soles are of the greatest importance. These made on the shoe formed upon the ordinary last, render it hard, unyielding, and trying to the foot; and before the shoe has been so formed to it, which it can only be imperfectly at the best, the foot has become tender and perhaps lame. But upon the shoe made on your last, the thick soles can be placed, and the shoe worn with all the comfort of an old and well-fitted one; coming, as it does, from the maker's hands precisely adapted to the natural form and arches of the foot. The mechanical support afforded by a thick sole can only be appreciated by those who have tried both thin and thick.

These are some of the important ends attained by your excellent Lasts, which I believe will be sufficiently and at once apparent to all who use them.

That you may reap the pecuniary reward which your skill and ingenuity so well entitle you to, is my earnest wish. I remain, dear Doctor, as always, faithfully your friend.

TO J. C. PLUMER, M. D.

GILMAN DAVEIS, M. D.

My Dear Doctor: It gives me pleasure to add my testimony to the value of the "Patent Last," to the originality and accuracy of the scientific principles on which it is based, as well as to its great practical utility — and to express my entire concurrence with the views contained in the letter above from my friend Dr. Daveis.

Yours very truly,

JOHN T. GILMAN, M. D.

PORTLAND, Dec. 22, 1860.

Dear Sir: Without having had any practical experience as to the advantages to be derived from the use of your "PATENT LAST," I am convinced that it is constructed upon correct principles.

By the aid of your ingenious diagrams and models which you have kindly explained to me, these principles are easily apprehended, and the application of them in the manufacture of a proper covering for the feet must be preventive and frequently remedial of the diseases which, in the old method, are so numerous and so frequently attended with pain and deformity.

Fully conscious also of the beneficial effects upon the general health which walking "made easy" and pleasant, would produce in so many ways that readily suggest themselves to all, I cannot but express the gratification I feel that you should have directed your attention to this subject; and add my best wishes that your efforts should meet with the ample reward which, in my opinion, they richly merit, and be followed by even greater success, if possible, in perfecting an improvement so much to be desired.

I remain very truly yours,

WILLIAM WOOD, M. D.

TO J. C. PLUMER, M. D.

PORTLAND, July 12, 1860.

DR. PLUMER,

Dear Sir: Having learned the principles upon which your "Anatomical Last" is made, I was favorably impressed as to its efficacy in relieving a difficulty which we all have experienced, who have to walk considerably, viz: severe pain in the feet after walking. After having worn the boot made upon the "Anatomical Last," I found my anticipations more than realized. I can walk nearly all day without experiencing the above named difficulty in the least degree. I also escaped the torturing process of *breaking in* my boots, for they were as easy at first as after they had been worn.

Truly yours,

C. H. BURBANK, M. D., Now in the U. S. Navy.

BOSTON, July 26, 1861.

Dear Sir: I am greatly delighted with your newly-invented boots which I have worn during the past winter, and only wonder that the world should have been so stupid as not to have made the discovery half a century ago. Any one with a grain of common sense and a moment's reflection, cannot fail to see that your "PATENT BOOTS AND SHOES" are perfectly adapted to the foot, (that wonderful piece of *Nature's Mechanism*), giving to every portion of it a full and equal support — and I am sure that those who once make trial of your new invention will never go back to the old-fashioned boots or shoes, which are so prolific of Corns, Bunions, and a thousand other troubles. Your "Patent Boots" seem to be part and parcel of our *physical structure*, supporting the foot firmly, giving steadiness to the gait, and promoting human comfort to an eminent degree, especially in walking over rough surfaces.

I wish I knew of some means by which I could make known to every man, woman, and child in Christendom, the nature and importance of your invention.

Very truly yours,

MORRIS MATTSON, M. D.

65 Summer Street.

TO J. C. PLUMER, M. D.

I have given time enough in examining the "Patent Last," invented by Dr. Plumer, to give this opinion, viz.: that it appears to me that it is formed on correct principles, and that it will probably be found to answer most valuable purposes.

In regard to the details, I do not discover any fault; but if there be any, experience will probably soon lead to the correction of it.

I know that the amount of evil to the feet, and indirectly to the health, from faults in the shoes and boots commonly worn, is very great, and if all these evils should not be removed, I feel well assured that a great part of them would be, by the use of the "Patent Last" above referred to, after the corrections which experience will teach.

JAMES JACKSON, M. D.

Boston, Dec. 23th, 1860.

"I concur in the above."

Boston, Jan. 2, 1861.

HENRY J. BIGELOW, M. D.

It is rather remarkable that in almost every part of the world where shoes are worn, either for protection or ornament, they are liable to produce more or less uneasiness, distortion, or actual disease of the foot. This remark does not apply alone to what may be called the easier, or fashionable class of society; it is equally true with regard to those who are obliged to work for their daily bread.

A person having charge of a hospital, where all kinds of affections of the lower extremities are constantly presenting, is very much struck with the distorted condition of the feet in working people.

The great toe is usually pushed outward so as to produce an enlargement of the bone, or disease over the articulation of the first joint, and the little toe is crowded inwards with a hardened excrescence on its outer surface, or it will be found that all the toes have been so forced together, that one of them, generally the second, is misplaced either above or below the others, and the ends of them are so pressed down and stiffened in that position, as to be very much shackled in their motions, thus affording a striking contrast to the foot in its natural condition, where the toes are almost as pliable as the fingers, and the foot can be educated to perform some of the duties of the hand.

To prevent these troubles and deformities, and to place the foot in as comfortable a condition as possible, Dr. Plumer has invented a last which, so far as I have examined it, and am capable of understanding its objects, is likely to remove some of the objections to those shoes as they are usually made. At any rate, if a single fault can be remedied in the ordinary method of construction of shoes, it is worthy the attention of the public.

J. MASON WARREN, M. D.

Boston, April 15th, 1861.

49 Harrison Avenue. }

DR. J. C. PLUMER:

Dear Sir:—It gives me pleasure to state to you the result of my experience in the use of boots and shoes made upon your Patent Last.

An early investigation of the principles involved in your invention enlisted my judgment in its favor, as I think they would not fail to impress any one favorably who has studied the solid structure of the human foot.

A practical experience of my own, and also that of several members of my family for nearly six months, has fully convinced me of the correctness of these impressions.

In consequence of extreme sensitiveness occasioned by a rheumatic affection, my wife has hitherto been unable to wear a boot or shoe of suitable thickness and firmness for the safety of her health in street walking, until she tried those made upon your last, which we are happy to say have answered the purpose perfectly.

Your improved last produces a boot or shoe perfectly comfortable at first, no matter how thick and substantial the soles; and the importance of these for pedestrian purposes cannot be exaggerated. In the wet weather they are indispensable to the preservation of health, and upon hard and rough pavement, the mechanical support afforded the foot is essential to its integrity and comfort.

I will farther add, that I most heartily concur in the remarks on this subject by my venerable friend and former teacher, Dr. James Jackson.

JOHN W. WARREN, M. D.

From J. V. C. Smith, M. D. formerly Mayor of Boston.

PLUMER'S PATENT BOOTS.

The undersigned has worn a pair of these IMPROVED BOOTS, and feels grateful to the inventor for the comfort derived from them. The nice adjustment of the sole to every part of the under surface of the foot, is an important circumstance which seems to have been entirely overlooked till Dr. Plumer planned his Last and Boot upon truly Scientific Principles.

Those who have once had an opportunity to test the real advantages of these Philosophically made Boots, will hardly be reconciled to wear any other.

J. V. C. SMITH.

From Dr. Lincoln, Brunswick, Maine.

BRUNSWICK, August 20, 1861.

D. ROBINSON, JR., & Co., PORTLAND:—

Gentlemen,—I have been wishing for many years that some one would make a Last in shape of the foot. I am now wearing boots, which I bought of you last spring, (made on "PLUMER'S PATENT LAST,") fully gratifying my wish. No one will wear any others, after trying these.

Your humble servant,

ISAAC LINCOLN.

[From the *Boston Courier* of Feb. 8, 1862.]

A COMFORTABLE UNDERSTANDING.

We notice in the last number of the *Boston Medical and Surgical Journal*, a paper by Dr. J. C. Plumer, upon the mechanical distortions of the human foot, their prevention and remedy, in which the evils consequent upon improperly made boots and shoes are shown, with their cause and the simple and effectual remedy for them is pointed out. Dr. Plumer, who is a gentleman of great mechanical ingenuity, as well as of scientific acquirements, has devoted a number of years to the study of this subject, which is one of no slight importance. It involves the comfort, and not only the comfort but the health and usefulness of every individual; and perhaps there is no benefit which surgery could confer upon the whole community greater than to obviate those tortures, and to prevent that distortion and lameness which are the too common effects of such coverings for our feet as are commonly provided for us. We are glad to know that a LAST, in which the principles of prevention and cure pointed out by Dr. Plumer are embodied, is now in very general use. Having been ourselves for more than a year in the enjoyment of the benefits of this invention, we can speak decidedly of its advantages, and of the perfect comfort, from the very first day's wear, of boots and shoes made upon this plan. We are pleased also to learn that many of our most extensive wholesale manufacturers now use Dr. Plumer's LAST, some of them exclusively; and that all the best custom makers throughout the country are adopting it. It certainly only needs to be once experimentally known to be everywhere adopted by one consent.

NEW YORK, April 12, 1861.

My Dear Doctor,—I am wearing with the utmost ease and satisfaction the "Patent boots." I believe they are constructed upon truly scientific principles. The long and transverse arches of the foot are preserved. The heel is made firm and solid, and they are altogether the most comfortable walking boot I have ever worn. You have done the human family a great good by this invention, for it is evident that deformities of the feet may be prevented in the young, and more or less perfectly corrected in the old, by wearing coverings made upon your "Patent Lasts."

Very truly yours, etc.,

D. S. CONANT, M. D., 133 Fourth Avenue.

TESTIMONIALS.

LITERARY.

[From the *Portland Transcript*, Jan. 26, 1861.]

MR. EDITOR: That you may grow cucumbers to a bottle, and oblige them to take the shape of the bottle, everybody knows or ought to know. That the human foot may be transformed in the same way, and be made to take upon itself any shape, according to the whim of a shoemaker, ought also to be known, and the sooner the better; lest God's handy work be utterly spoiled by little and little, before the sufferers get their eyes open, or the *understandings* enlightened enough to see or feel the truth.

Having tried the new last of Dr. Plumer, and worn the boots long enough to be able to speak without any serious misgiving, allow me to say, as a matter of duty, and of my own free will, without solicitation, that I look upon the invention as among the most truly scientific and comfortable, and promising, of our age. Of course improvements may still be made, and if this were a proper time I might suggest one or two, as General Jackson did a new system of banking when heartily sick of the old, but as they would not effect the principles involved, and relate only to their application, there is no need of waiting till no further improvement *can* be hoped for, as some do.

J. NEAL.

[From the *Boston Courier*, Feb. 16, 1861.]

EASY BOOTS AND SHOES. — Some weeks since we called the attention of our readers to a very ingenious application of the principles of anatomy to the manufacture of boots and shoes, made by Dr. Plumer, of Portland. At that time, although we could not but be convinced of the simplicity and correctness of the principle upon which Dr. Plumer's lasts are constructed we had not the practical experience which now enables us to say that boots made upon them more than fulfil all that their ingenious inventor promises; they are as easy from the first day "as an old shoe," being at the same time in no way less elegant and tasteful to appearance than the old instruments of torture which are so frequently flung away with execrations both loud and deep. A number of ladies and gentlemen of our acquaintance have availed themselves of the invention of Dr. Plumer, and are unanimous in its praise. It meets with the approval of our best surgeons and physicians, and cannot fail of immediate adoption, wherever it is properly made known. We extract the following from the *Boston Medical and Surgical Journal* of the 31st ult.:

A SENSIBLE SHOE. — We have often heard old people, who have outlived their vanity, talk about "sensible shoes," by which phrase they intended to convey the idea of long, wide, leather receptacles, too large for the feet. This view being too repulsive to the minds of those who had more æsthetic ideas, has not been generally adopted. Unfortunately, the latter have forgotten the danger of forming a shoe upon the principles which guide them in the construction of a bonnet. To vary the shape, as is constantly done, without regard to the confirmation of the foot, is sure to be followed by deformity and all its attendant sufferings.

Dr. Plumer, of Portland, has designed a last upon what, the most skeptical will allow, is, at least a correct principle. He has taken the foot itself as a model, and given it support where the latter is most needed, and avoided pressure which could only be injurious. The principle improvements are in the shape of the sole, and the position of the heel, and we feel persuaded that the adoption of them would add much to the comfort of those who

"Sow in suffering what they reap in corns."

"SOUTH BEND, IND., February 16, 1861.

"D. ROBINSON, JR. & Co. — *Gentlemen*: Having for a week past worn the boots made for me upon the patent last invented by J. C. Plumer, M. D., I feel qualified to report concerning them. I have heretofore had much difficulty in finding boots which would suit my feet, and have usually been obliged, for the sake of ease, to select those which were considerably larger than necessary.

"From the closeness and neatness of the fit, in the pair you made, I was apprehensive of a similar difficulty, but to my gratification, I have found that they do not in the least cramp the foot in walking.

"The first thing which struck me was the great firmness and security given to the tread by the position of the heel; the next, the support which the ball of the foot receives, and the free play allowed to the muscles of the toes. These peculiarities give the boot an advantage, for pedestrian exercise, over all others with which I am acquainted.

"There is no part of our clothing in which a reform is more needed, and I hope that your success may partly falsify the classic proverb, and prove that the shoemaker may, at least, go beyond *his old-fashioned last*.

"Respectfully yours, "BAYARD TAYLOR."

Let Dr. Plumer become the patron saint of our shoemakers — our modern St. Crispin — and we shall stand upon another and much easier footing.

Then may those walk who never walked before,
And those who always walked now walk the more.

[*From the New York Evening Post, May 7, 1861.*]

"UNTO THIS LAST."

Several months ago we took occasion to call the attention of the readers of the *Evening Post* to a little book entitled "Why the Shoe Pinches," by Prof. Meyer, of Zurich, one of the highest continental authorities on Physiological Anatomy, who has devoted himself particularly to the study of the structure and mechanical adaptations of the feet and lower limbs. In this little treatise the Professor dwells on "the arrogant absurdity of which fashion is guilty in going so far as to determine the shape of our feet," and insists that fashion should take the cut of the shoe from the form of the foot, and not cramp the form of the foot to fit the shoe; and, moreover, proves clearly that "the influence of fashion on the shape of the shoe produces the most baneful effects on the mechanism of the foot and on its soundness, and thus materially affects our moving about and our consequent ability to take a sufficient amount of open-air exercise." Other eminent anatomists have called attention to the diseases and serious distortions of the foot produced by badly-made and ill-fitting boots and shoes. Camper, a distinguished anatomist of the last century, in a paper "On the Best Shoe," remarks: "All horse-doctors and horse-fanciers are interested in the shoeing of their horses; numerous papers appear thereon; and shall we not concern ourselves about the foot-gear of man?"

The suggestions of these eminent men, though they attracted considerable attention, were not found practicable, and there was always the objection that the form of the shoe recommended was very clumsy.

It remained for one of our countrymen to suggest a practical remedy for the abuses of the feet, and to furnish a shoe which should be elegant in form, and at the same time perfectly adapted to the needs of the foot in walking. Dr. J. C. Plumer, of Portland, Me., has made the mechanical anatomy of the foot the subject of special study, and has invented a LAST constructed in accordance with the bony and ligamentous conformation of the sole and back part of the foot, when the heel is *elevated*, and he claims that boots and shoes made upon it will not only prevent deformities, but correct those already existing. Dr. Plumer has also published a valuable little treatise on "The Mechanics, Mechanical Anatomy, and Mechanical Distortions of the Bony Structure of the Human Foot," in which he shows that the foot in its natural state is a double arch — a longitudinal arch from heel to toe, and the transverse arch from side to side, upon which two arches the entire weight of the body rests. The shoes made upon the "Patent Lasts" are exactly fitted to support these arches. The last being hollowed from end to end and from side to side, and having indentations and projections exactly where the bones of the normal foot have them, so that the shoe is "broken in" by the shoemaker's hammer, instead of the foot of the wearer, which has heretofore done that work; hence it is found that a pair of new shoes made on the new last are as easy as old shoes of the old pattern. They are constructed with a view to the support of the foot. One important improvement in the new last consists in bringing forward the heel. Dr. Plumer shows that the ball of the foot and the heel are the two abutments upon which the longitudinal arch of the foot rests, and that if the heel be placed too far back the weight of the body depresses the centre of the arch, which is the instep, and produces the common deformity of a flat or splay foot. Indeed, the whole tendency of boots and shoes constructed in the prevailing style is to break down instead of to support the bony structure of the foot.

We have endeavored to point out some of the advantages of this ingenious invention, and refer our readers to Dr. Plumer's pamphlet, in which he treats the whole subject of the mechanical affections and anatomy of the foot in a very able manner, illustrating his subject by diagrams. Since the introduction of his anatomical last, Dr. Plumer has received numerous letters from scientific and practical men, all of whom give it unqualified praise, and he has been invited by the students in several of our medical colleges to give a practical demonstration of the principles involved in the construction of his last, and they have expressed their approval. It commends itself to surgical attention at once.

[From the Boston Daily Courier, May 21, 1861.]

LITERATURE.

WHY THE SHOE PINCHES: a Contribution to Applied Anatomy. By Hermann Meyer, M. D., Professor of Anatomy in the University of Zurich. Translated from the German by John Stirling Craig, L. R. C. P. E., etc. American Edition: edited by J. C. Plumer, M. D. Pamphlet, 8vo., pp. 24, with illustrations.

We have previously, on several occasions, called the attention of our readers to the improvements which have been recently introduced into the manufacture of boots and shoes, by the American editor of the brochure before us. After reading the little book by which Dr. Plumer's most ingenious adaptation of the covering of the foot to its anatomical structure was made known, and still more after having had for many months a demonstration of the correctness of the principles upon which this adaptation was made in our own person, we could not but feel that we were conferring a favor upon the public by making the facts as widely known as possible. That Dr. Plumer's invention has attracted the favorable attention of the leading physicians and surgeons of Boston, New York, and Philadelphia, is much, but the combined and universal testimony of wearers in its favor, is more. Not only is the *principle* right, it is also *rightly applied*; and henceforth if any one allows himself to be put to the torture by the sons of St. Crispin, it is his own fault.

The pamphlet "Why the Shoe Pinches," by Prof. Meyer, is reproduced in this country, says Dr. Plumer in his preface, not on account of the novelty or practical value of its directions, but to show that men of high scientific and professional eminence do not regard the subject as beneath their attention. Dr. Plumer goes on to say, that had this pamphlet been in this country prior to the appearance of his own publication on "The Mechanical Affections, Mechanics, and Mechanical Anatomy of the Bony Structure of the Human Foot," (the little work to which we first called the attention of our readers,) it might have been inferred that many ideas had been derived from that source. Such, however, was not the fact. We may add, after a careful examination of both, that notwithstanding Prof. Meyer's great and just reputation, he shows himself much less master of the subject than his American contemporary. The changes which he suggests are evidently far from reaching the real evil, while they necessitate an alteration in the external form of the boot such as no gentleman would care to appear in. This is not the case with boots from Dr. Plumer's last, which, obviating all evils most completely and radically, are yet not inferior in external elegance to any heretofore sold. We may add, for the convenience of our readers, that boots from these lasts are made by Messrs. Moseley & Co., Summer Street; and on a large scale, for the wholesale trade, by Messrs. Lindsley, Shaw, & Co., No. 109 Pearl Street

[From the Boston Traveller, June 17, 1861.]

IMPROVEMENTS IN BOOTS AND SHOES.

Among the recently issued patents we notice one of great practical value to every individual of civilized life. It is for a *boot or shoe* scientifically constructed. Dr. J. C. Plumer is a regularly graduated physician, now resident of this city, has made the mechanical anatomy of the foot the subject of especial study, and has invented a Last constructed in accordance with the bony and ligamentous conformation of the sole and back part of the foot, when the heel is *elevated*, and he claims that boots and shoes made upon it will not only prevent deformities, but correct those already existing. The productions from the patent *lasts* are boots and shoes properly formed, and which are broken in by the shoemaker's hammer, instead of the foot of the wearer, which has heretofore done that work; hence it is found that a pair of patent boots or shoes are easy to the foot at first.

[From the Boston Journal of Physical Culture, August, 1861, by Dio Lewis, M. D.]

A NEW SHOE LAST.

Dr. Plumer has patented a Last, known as Plumer's Last, which is really one of the happiest inventions of the day.

It is the first application of common sense to the manufacture of boots and shoes.

I suppose it happened in this wise:—Dr. Plumer was tortured by a pair of the ingeniously cruel shoes now in vogue, and it occurred to him, as a means of relief, to have a pair made which should exactly fit his feet. So taking off his shoes and stockings, he had a model of the bottom and sides of his foot taken in plaster, and a last made of exactly the same shape. A pair of shoes being made on this last gave him, of course, a shoe as easy as a stocking.

I have a pair of shoes made on the new last, on my feet, while writing this. The day is a warm one, and I have been on my feet for six hours; the shoes are new and close fitting, but the feet do not suffer in the least.

It is curious to compare the new last with the old one. One can hardly believe they were designed for the same purpose.

If any one desires to examine the last, at the shoe store under this Gymnasium, it can be seen.

[From the Evening Transcript, Saturday, Aug. 3, 1861.]

FOREIGN PATENTS FOR AMERICAN INVENTIONS.

As a curiosity in its way, an English patent with the royal seal of Great Britain, may be seen in the window of the store of T. E. Moseley & Co., Summer Street. It was recently granted to J. C. Plumer, M. D., of this city, for "*improvements in the construction of boots and shoes*;" in regard to which we have seen some of the best testimonials, among them that of Bayard Taylor. In regard to our own experience with boots from the above establishment, we can speak with unqualified satisfaction. We understand Dr. Plumer is meeting with flattering success in the introduction of his improvements, and we can hardly conceive the contrary in an intelligent community.

[From the Boston Daily Advertiser, August 31, 1861.]

THE ANATOMIC LAST.

Dr. John C. Plumer, a physician of education and experience, has made a special study for several years of the anatomy of the human foot, with a view to the relief of pain and the security of health to result from the wearing of boots and shoes properly constructed to secure these great objects. The results of his study take shape in the "Anatomic Last," of which he is the inventor and patentee. He has obtained patents for his Last in America, France, and England. The principles upon which it is constructed have received the approbation of some of the highest medical authorities, and it has already been introduced into actual use by many individuals for their own wear, and also by some of the largest manufacturers.

It is sufficiently palpable to all observation that boots and shoes ordinarily worn have a very different shape from that of the natural foot; but it does not follow that a last which actually reproduces the existing shape of the foot of any person, will be the proper basis for a boot or shoe for him to wear. Such lasts are liable to make unsightly as well as uncomfortable boots and shoes, because they exaggerate the distortions which have arisen from the wearing of ill-fitting shoes before.

Dr. Plumer has proceeded upon the principle of ascertaining by careful study which parts of the foot require support, which can and which cannot bear pressure, and upon what points the weight of the body should be thrown. Within these limits he has sought to make his lasts the exact shape of the natural foot. Thus he finds that the sole of the foot is naturally a double arch;—man being, so to speak, quadripedal, or at least tripodal, in each of his bipedal extremities, (this jargon is our own, not the doctor's,) and accordingly the bottom of one of Plumer's lasts is concave, instead of convex, as is the common last. The weight of the body is thus thrown upon those parts of the sole of the foot which nature designed should bear it, and not upon other parts unfitted for the function. In like manner an easy play is secured for the anatomy of the instep, and for the muscles which regulate the movements of the toes.

There is abundant evidence of the relief experienced by those who wear boots and shoes made upon the "anatomic last," besides the high medical and practical authority in its favor. Among the medical authorities who bear witness to the correctness of the principles involved in the construction of this last, are Dr. James Jackson, Dr. J. Mason Warren, Dr. John W. Warren, and others.—Ladies as well as gentlemen are admitted to share in the advantages of this great reform. A tariff of charges for the privilege of the patent last, exceedingly moderate in amount, has been established, and we cannot doubt that its use will speedily become general.

[From the Boston Journal, Friday, Sept. 20th, 1861.]

PLUMER'S PATENT BOOTS.

Dr. Plumer's Patent Boots and Shoes, advertised in another column, have been before the Boston public, for the past year, and are now being made by many of the leading manufacturers of this and other States. They are constructed upon an improved last, also the subject of a patent by Dr. P., the peculiarities of which are that it is so formed as to fashion a boot or shoe which will prevent distortions of the foot, and tend to correct already existing ones, produced by wearing badly made shoes, hitherto so general.

The above inventions are receiving the highest degree of scientific, as well as practical approval, as will be seen by reference to testimonials of some of the most eminent Physicians and Surgeons of this and other cities.

[From the Boston Post, Wednesday, October 16, 1861.]

The Patent Boots and Shoes by Dr Plumer, advertised in another column, are rapidly coming into general public favor. One peculiarity of the lasts upon which these boots and shoes are made is that in profile they represent that of the foot when the heel is elevated and the *shank* is shortened. In combination with this is a more important feature, viz: the lasts are so conformed on their under surface as to produce depressions and elevations upon the sole of the boot or shoe which are the counterpart of the outlines of the solid structure of the foot. This combination, the patentee claims, "involves an important principle, the result of which when applied to manufacture, is not only an immunity from the painful 'breaking in' process, rendering comfortable thick soles, a much needed protection against hard, rough pavements, cold and damp, but a protection to the integrity of the structure of the foot, preventing and correcting distortions."

Dr. P.'s testimonials are of the highest order, from which we select the following of the Hon. Montgomery Blair, our present Postmaster General:—

WASHINGTON, Nov. 24, 1860.

Dear Doctor: I like the shoes made on your lasts so well that I mean to wear them altogether, and write now to get you to have me a pair of lasts made and sent on.

Yours truly, M. BLAIR.

BOSTON, March 28, 1861.

DEAR SIR: In answer to your favor of the 26th instant, we have now been using your "Patent Last" for the past six months, and from our own personal experience, and observation of that of others, we do not hesitate to pronounce it the best last ever produced.

Respectfully yours,

T. E. MOSELEY & CO., Summer Street, Boston.

BOSTON, March 15, 1861.

DR. PLUMER: I have now been engaged for nearly a year, at the establishment of T. E. Moseley & Co., in making to measure Custom Boots and Shoes on your Patent Last, and with few exceptions usually unavoidable, with gratifying success, and general satisfaction to our patrons.

JAMES McCONOLOGUE.

BOSTON, Sept. 14, 1861.

DR. PLUMER,—*Dear Sir:* I have been engaged in making Custom Boots and Shoes upon your Patent Last the past three months, and with invariable success and satisfaction to my customers.

F. SMALL, Essex Street.

BOSTON, Sept. 14, 1861.

I have used Dr. Plumer's PATENT LAST for the last few weeks, and am happy to say, with perfect success, and would highly recommend them to the public.

H. M. ANDERSON, 27 Bromfield Street.

BOSTON, November 29, 1861.

DR. PLUMER,—*Dear Sir:* I have used your "PATENT LAST" for nearly six months past, and more generally for that class of feet which have a great tendency to wear Boots unevenly; and in no single case have they failed to correct the difficulty and give entire satisfaction to the wearer. Your Lasts, especially for this class of feet, I consider invaluable, and in my opinion, they will come into general use.

WM. PROCTOR, No. 15 Water Street.

[Established in 1815.]

IMPROVED LASTS FOR BOOTS AND SHOES.

PATENTED JULY 17, 1860, BY J. C. PLUMER, M. D., PORTLAND, MAINE.

SELECTIONS FROM THE SPECIFICATION AND CLAIMS.

"This invention has for its object the construction of Lasts for Boots and Shoes in a novel manner, and in such a way that the entire bottom of the Last will correspond to the *bony and ligamentous* structure and conformation of sole, back, and heel of the natural or normal foot, so that a shoe produced upon such a Last will prevent distortions and deformities of the foot or joints of the foot, callosities upon the toes, etc., and *relieve and correct* them where they already exist.

"The invention provides for pressing the plantar tissues or cushion of the hollow portion or groove in the arch of the foot, against the metatarsus, causing a separating or spreading effect laterally upon it, thereby preventing compression of the anterior tarsal, metatarsal, or phalangeal bones. It also provides for affording a constringing support around and longitudinally to the arch and sides of the foot, at or under the astragalo and calcaneo-tarsal articulation, or union of the bones of the heel with those of the arch of the foot.

"It also provides, by the curved form of the bottom and back part of the heel of the last, — for an *advanced position* of the heel of the last, or *heel seat* of the last, — whereby the position of the boot heel is advanced nearer to the front part of the foot, the *shank of the boot is shortened*, and the point of support brought more directly under the line of the tibia, or bone of the leg, rendering a stiff, uncomfortable shank unnecessary.

"The shape of the lasts that are at present made, produce in boots or shoes made on them, curves, elevations, and depressions that are contrary or antagonistic to the natural conformation of the bony and ligamentous structure of the sole of the foot, which have a decided tendency to deform the foot, and the results are manifested by the deformities, distortions, callosities, &c., that result from this malformation of the soles of boots and shoes that are at present worn. The surface of the inner sole is made concave where it should be convex, the heel seat, if there be any, is thrown back too far from the ball portion of the sole, and consequently the axis of the body is brought nearer to the articulation or joint of the anterior with the posterior portions of the tarsal bones, and the weight of the body over this point dislocates or stretches the bony and ligamentous structure of the arch of the foot, and the chord of the arch is distended and the foot necessarily flattened, and its natural shape and functions seriously injured.

"This invention is intended to obviate these objections, and it consists firstly in making the under surface or sole of the last, laterally concave from the *front of the heel to the toe* of the last.

"It further consists in curving the heel portion of the last in such a manner, that a rotundity will be formed corresponding to the posterior extremity of the os-calcis or heel bone, with its ligamentous attachments, which will give the heel an advanced position, diminish the length of the shank, and bring the point of support nearer to the line with the axis of the tibia and fibula, or bones of the leg, affording ease and giving antero-posterior support to the heel of the foot, and supporting the foot to a great extent at the astragalo and calcaneo-tarsal articulation, as will be hereinafter described and represented.

"It further consists in combination with the advanced heel seat in constricting laterally, that portion of the last in the middle of the arch, corresponding to the fleshy portion surrounding the astragalo and calcaneo-tarsal articulation, making it conform and adapting it to this part so as to give a uniform pressure upwards and bi-laterally, as will be hereinafter described and represented."

CLAIMS.—I do not claim the elevated and rounded heel seat, as such; nor do I claim the so-called spring of the front part of the last, as such; nor do I claim a cast of any material, or a last fashioned from such a cast for individual feet entire, fleshy form and all; but what I do claim as my invention, and desire to secure by Letters Patent, is:—

1. The longitudinal hollow or depression on the bottom of the last.
2. The combination of the longitudinal hollow with the advanced position of the heel seat.
3. The constricted portion of the last *c, e*, in combination with the longitudinal hollow.

IMPROVEMENTS IN THE CONSTRUCTION OF BOOTS AND SHOES.

PATENTED JUNE 4, 1861, BY J. C. PLUMER, M. D., PORTLAND, ME.

COPY OF SPECIFICATION AND CLAIMS.

TO ALL WHOM IT MAY CONCERN.

BE IT KNOWN, THAT I, JOHN C. PLUMER, OF PORTLAND, IN THE COUNTY OF CUMBERLAND AND STATE OF MAINE, have invented certain new and useful improvements in BOOTS and SHOES, and that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, in which Figure 1 represents a side view of a shoe constructed according to the principles of my invention; Figure 2 represents a transverse section of the same at the line *xx* of Figure 1; Figure 3 represents a transverse section of the same at the line *yy* of Figure 1; Figure 4 represents a transverse section of the same at the line *zz* of Figure 1, and Figure 5 represents a longitudinal section of the same, following the middle line of the sole.

The objects of my invention are to make shoes and boots conform to the *bony and ligamentous structure of the natural foot*, and to obviate the disadvantages which result from the use of boots and shoes constructed in the methods heretofore practiced. My invention is divided into *parts*, which may be used *separately or in combination*, but I believe that a boot or shoe of the best construction will be obtained by using *all the parts* of my invention in *combination* in the same boot or shoe.

THE FIRST part of my invention has reference to that portion of the sole which is beneath the *ball of the foot*. Previous to my invention it has been customary to construct the sole at this portion of equal or nearly equal thickness transversely, and as the sole of the shoe is convex on its exterior, the interior is correspondingly *concave*. A sole of this construction is directly the *reverse* in form of the *bony and ligamentous structure* of the *natural foot*, which has the form of a *transverse arch*, and is *concave* on its under side; as the foot is constricted by the upper leather of the shoe the tendency is to depress the *transverse arch* into the *concavity* of the sole of the shoe and to deform the foot, *bunion*, or the dislocation of the bones of the great toe, being frequently produced.

The object of the first part of my invention is to obviate this tendency, and it consists in combining an outer sole that is convex or flat exteriorly with an insole that is *convex at its upper surface*, the convexity of the insole corresponding in position with the rise of the *transverse arch* of the foot, so that the *depression thereof* is effectually prevented.

THE SECOND part of my invention has reference to that portion of the sole which connects the *heel* with that *portion beneath the ball of the foot*, which is commonly called the shank. Its object is to support this portion of the foot both *longitudinally and transversely*, and it consists in a shank which is *transversely convex* at its upper surface, in contradistinction to being transversely concave at its upper surface, as has been the case with boot and shoe shanks heretofore in use.

THE THIRD part of my invention has reference to the *shank and heel of a boot or shoe*. The human foot is composed of a series of bones and ligaments and fleshly muscles, and is arched longitudinally, the highest portion of the under side of the longitudinal arch being beneath the instep. When the heel rests upon a support which is *higher than the level of the ball of the foot*, the members of which it is composed tend to assume a more arched form, and if this tendency be prevented by the boot or shoe, there is a constant strain upon the foot which sometimes results in the breaking down of the longitudinal arch of the foot, thereby producing FLAT or SPLAY foot, and is always accompanied by the sensation of weariness. The shanks of ordinary heeled shoes have hitherto been made of about the same convexity *longitudinally* that they would have been if the shoes had been made *without heels*; moreover, the heels of the shoes have been set so far back and have been so short that they do not support the *anterior portion* of the heel of the human foot to which a considerable amount of the pressure in walking is applied; hence there has been a constant tendency in the foot to move forward in the shoe, and as this tendency has been counteracted only by the *pressure of the upper leather upon the instep*, the tendency has been to depress the instep and break down the longitudinal arch of the foot. The object of this part of my invention is to prevent this tendency, and afford an efficient support for the *anterior portion* of the heel of the foot, and it consists in combining the heel of a boot or shoe with the sole thereof in such manner that the heel extends forward *beneath the anterior portion of the heel of the foot*, and is there made *thicker* so as to support the insole in a proper convex form *longitudinally* beneath the foot, the shank of the boot or shoe being shortened in proportion to the advance of the heel.

THE FOURTH part of my invention has reference to the *upper leather of a shoe*. In order that the upper leather of a shoe may fit closely in the hollow at the inner side of the foot, it is advantageous to carry the front edge of the inner quarter as far forward as the most *hollow portion* of that hollow, and it has been customary hitherto to make the quarters at the opposite sides of the foot extend equal distances forward from a central seam at the back of the shoe. By this mode of construction the seam at the front of the outside quarter is located opposite the corresponding seam at the front of the inside quarter, and is immediately over or in close proximity with the *bony projection at the outer side of the foot*, which is frequently galled by the pressure of the seam. The object of this part of my invention is to relieve the bony projection of the foot from the pressure of the seam without interfering with the fit of the shoe, and it consists in combining the front piece with quarters at the opposite sides of the foot of *unequal length*, so that while the inner quarter extends sufficiently far forward to insure a close fit of the leather to the inner side of the foot, the seam at the front side of the outside quarter is *between the bony projection* of the foot and the *heel*.

All the parts of my invention are embodied in the shoe represented in the accompanying drawings. In this shoe the outsole *a* and the insole *bb*, are separated by a filling *c*, of such form that the upper surface of central part *b* of the insole protrudes into the shoe above the lateral portions *bb* of the insole, while the outer surface of the outsole *a* is slightly convex as usual. The protrusion of the insole thus produced corresponds with the rise of the central portion of the transverse arch of the foot, so that this arch is prevented from being broken down by the constriction of the upper leather. The filling *c* gradually decreases in thickness as it approaches the toe of the shoe, so that the inner surface of the insole is there parallel or thereabouts

with the outer surface of the outsole *a*. The filling *c* also extends towards the heel of the shoe through the shank *d*, so that the upper surface of the insole of the shank is convex, while the external surface of the shank is of the usual form, which is generally convex; the insole at the shank is thus protruded upward to support the hollow of the foot.

The heel *f* of the shoe represented is extended forward, and its *anterior part is raised* to support the insole.

The front edge of the heel may be extended with advantage to a distance from the heel of the shoe equal to one third the whole length of the shoe, and as a firm support is thereby furnished for the foot beneath the point at which the bones of the leg are jointed to the bones of the foot, the heel may be cut away behind as shown at *g*, so as to diminish the total length of the sole and heel of the shoe. As the front portion of the sole *a* beneath the ball of the foot is not shifted forward by this extension of the heel, the shank of my improved shoe is shorter than the shanks of shoes hitherto made; and as the pressure of the anterior part of the heel of the foot is sustained by the heel instead of by the shank, the employment of steel shank-plates or other means to prevent the shank from being broken down and sustain the foot are unnecessary, and the shank may be made more *flexible* than in boots or shoes hitherto made. The difference between my combination of the heel with the sole, and the old mode, may be seen by a comparison of the representation of the heel and sole of my shoe in Figure 1 with the dotted line *hh*, which represents the outline of the corresponding portions of a shoe of the old construction. In order to afford a firm lateral support of the heel of the foot, the heel of the shoe at the *periphery* is raised above its *central portion*, thus forming the lateral rims *ii*, that sustain the sides of the heel of the foot and relieve the most protuberant portion thereof of a portion of the pressure to which it is subjected in a shoe of the common construction.

The quarters at the opposite sides of the shoe are of unequal lengths; that on the inner side *j* extends forward from the heel about three sevenths of the total length of the shoe, terminating at the middle seam *k*. The outer quarter is much shorter, the position of its front edge being indicated by the dotted line *l*, Figure 5; as a general rule the distance of its front edge where it meets the sole from the heel of the shoe should be about one third of the total length of the shoe.

In order to construct boots and shoes embodying the first three parts of my invention, a LAST should be provided which is the counterpart of the interior of the shoe intended to be made, having concave depressions in the bottom to *correspond* with the transverse rise of the central portions of the insole. But a shoe may be constructed according to my invention by putting its parts together upon an ordinary last, and by fitting a *false insole* of the proper form into it after the last has been withdrawn. The false insole introduced may be kept in place by an adhesive cement, such as glue or India rubber composition, or by means of pegs or tacks. THE FIRST THREE PARTS of my invention are applicable to boots as well as shoes; the fourth part is applicable especially to shoes, but may be applied to those boots which have a *back seam*.

Having thus described a shoe embodying all my improvements, what I claim as my invention in boots and shoes is—

FIRST: The combination of a sole that is flat or convex exteriorly, with an insole that is convex at its upper surface, substantially as described.

SECONDLY: A shank that is convex at its upper surface, substantially as described.

THIRDLY: The combination of an elongated heel with the sole, substantially as described.

FOURTHLY: The combination of the front piece of the upper leather with quarters of unequal length, substantially as described.

FROM
“THE PRACTICE OF SURGERY,

“BY JAMES MILLER, F. R. S. E., F. R. C. S. E.,

“Surgeon in ordinary to the Queen of Scotland; Surgeon in ordinary to his Royal Highness Prince Albert, for Scotland; Professor of Surgery in the University of Edinburgh; Consulting Surgeon to the Royal Infirmary, etc., etc., etc.”

“FOURTH EDITION, FROM THE LAST EDINBURGH EDITION.”

“AFFECTIONS OF THE FOOT.

“TALIPES.

“By this term is understood the deformity of *Club-foot*; generally congenital; yet, not unfrequently acquired. The original development of the bones is not faulty; but displacement of these is gradually effected by a preponderance of action in certain muscles; such preponderance being dependent either on spasm of those which so act, or on want of action in those which ought to be their antagonists. There is no actual *dislocation* of the tarsal bones; there is merely a *gradual change* in their relative positions.

“There are varieties of this deformity.



Talipes Varus.



The same dissected; showing the altered relative position of the bones.

“**TALIPES VARUS.** This is the most common variety; consisting of extension, adduction, and rotation of the foot—the rotation being analogous to supination of the hand. The muscles of the calf and the adductors of the foot are contracted, the heel is drawn up, the toes turn inwards, the outer edge of the foot rests on the ground, and in progression, weight is borne on the outside of the foot, and on the outer ankle—where adventitious bursæ usually form of some size. * * * *

‘One foot, or both, may be affected by Talipes. In the former case, the affected limb is found thinner and more flabby than the other, and sometimes, by arrest of development, it is shortened as well as weak. The mode of progression is painful and imperfect, and not unfrequently contraction takes place at the knee to a greater or less extent.

“**SPURIOUS TALIPES** is said to occur when displacement of the foot takes place by muscular change or integumental contraction, following on burns, suppurations, ulcers, &c.

“TREATMENT OF TALIPES.

“In the minor cases, which occur in children, *mechanical means*—early employed, *skilfully adapted*, and *duly persevered* with—are alone sufficient to effect a normal relation of parts. Many such cases occur, and it is quite unnecessary to subject the little patients to the pain of tenotomy.

“When the deformity obviously depends on a paralytic condition of certain muscles—as is more likely to be the case in the *acquired* than in the congenital examples—attempts may be made to obviate this condition by remedies directed both to the system and to the part. * * *

“Tenotomy is had recourse to when structural shortening of the muscle, or tendon, or of both has occurred, and when the obstacles to replacement cannot otherwise be overcome. A large number of cases are so circumstanced.

“The operations, however, are but part of the remedial means, and will certainly fail unless *suitable apparatus* be afterwards employed, *well and sedulously*. * * *

“The mechanical apparatus need not be described. Many varieties are in use; the simplest usually the best. For the Talipes Equinus and Talipes Varus—the two most common varieties—the indications are simple, and may be simply executed; flexion of the foot by acting on the ankle, and restoration of the normal position of the foot, as regards rotation and abduction, *by acting on the foot itself*.”

MECHANICAL APPLIANCES IN TREATMENT OF TALIPES.

Regarding the *mechanical* treatment, TALIPES, in the adult especially, — and the same remarks apply as childhood is more advanced, — it seems too little attention is usually bestowed upon the nice adjustment of the mechanical means adopted.

The *sole* of the boot or shoe, upon which the foot is to rest and be supported, should be *formed* and *adapted* to the intended purpose, for so long as the nice adjustment of the one to the other is overlooked, the *upper* portion of the apparatus is of comparatively little importance, and the metallic springs, supports, &c., frequently the source of painful excoriations.

It is evident that if, according to Professor Miller, “the original development of bone is not faulty; but *displacement* of these is gradually effected,” &c.; the restoration must also be accomplished in a gradual manner.

If the *shoe* can be so adjusted to the sole of the foot, that at each step the weight of the body borne upon it tends to throw the foot into a position more approaching that of nature, we escape the disagreeable consequences of pressure upon the upper soft parts of the foot and ankle, and are exerting a direct and continued *straightening effect* upon the member during its use. This is not only desirable to persons absorbed in business avocations, but at the same time the foot is benefitted by exercise.

And it would seem that the circumstances most favorable to the restoration of the bones to their natural position, *are with the foot duly exercised*, under the continued influences of orthopedic mechanical appliances to the *sole* of the foot.

In support of the supposition, the following case is presented with the patient's own statement:

H. P. S. — *Æt.* 25 years, of medium stature, light complexion, and sanguineo-nervous temperament. At the age of six or seven was thrown from a wagon, striking the small of the back upon a stone. Was taken up insensible and in spasms, receiving no other known injury than evident concussion of the spine, from which there was apparently speedy recovery. Recollects that some three or four weeks afterwards, having recovered so as to attend school, his parents observed inability to raise the front part of the left foot; with frequent tripping and falling; which continued according to best recollection, for two or three years.

In the mean time abscesses made their appearance on the instep, beneath the inner ankle, and at other points, coming and going, up to the age of nine to ten, when they disappeared altogether, leaving the foot much in the condition in which it has since remained. The patient has no recollection of exfoliation.

During the interval of fifteen or sixteen years, he has made use of all usual orthopedic appliances, with springs, supports, pads, &c., up to the time of his having a cast taken of his foot, with the view to procuring a LAST, and from it a properly constructed shoe — and with what success his own testimony is presented.

The present appearance of the foot in different aspects are represented in figures 1, 2, and 3, —



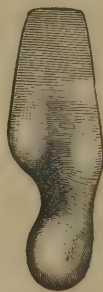
1. Inside.



2. Outside.



3. Front.



4.

Figure 4 representing the under or treading surface of the LAST upon which the shoe was constructed.

DR. PLUMER, — *Dear Sir*: After having worn for several months, the scientifically constructed shoe which you provided for me, I can speak of it with grateful satisfaction, as a vast improvement over the multitude of contrivances which I have previously used.

The essential point gained is, that it keeps the foot firm and erect in walking, without producing pain and soreness as has always been the case with those having iron or steel supports about the ankle.

By its use my improvement has been such as to surprise my friends, as comparatively any lameness is now noticeable, and to afford me much happiness from the ease and comfort derived.

Please accept my grateful acknowledgments.

Respectfully yours,

H. P. S.

MARLBORO' HOTEL, Boston, July 30, 1862.



Figure 5.

Front aspect of left foot, and shoe constructed and adjusted according to the foregoing suggestions.

Respectfully,

J. C. PLUMER, M. D.,

111 Pearl Street, Boston.

[P. S. It is proper to notice in this place that the patient is much indebted to the practical skill and honest endeavors of H. M. Anderson, 27 Bromfield Street, of this city.]

WHO MAY APPLY FOR AND HAVE PATENTS.

Extracts from United States Patent Laws.

And be it further enacted, That any citizen or citizens * * * of the United States, who, by his, her, or their own industry, efforts, genius, and expense, may have invented or produced any new and original DESIGN, or a MANUFACTURE, whether of metal or other material or materials, * * * or any new or original impression or ornament, or to be *placed* on any article of manufacture, * * * or any new and *useful pattern*, or *print*, or *picture*, to be either cast or otherwise fixed on any article of manufacture, or any new and original *shape*, or *configuration* of any article of manufacture not known or used by others, before his, her, or their invention or production thereof, * * * and who shall desire to obtain exclusive property, or right therein, to *make, use, sell and vend* the same, or copies of the same to others, by them to be made, used, and sold, may make application, in writing, to the Commissioner of Patents, expressing such a desire; and the Commissioner, on due proceedings had, may grant a Patent therefor, * * * for the term of fourteen years.

Extract from United States Patent Laws, Sect. 5, of the Act of 1842.

And be it further enacted, That if any person or persons shall paint, or print, or mould, cast, carve, or engrave, or **STAMP** upon any thing *made, used, or sold* by him, for the *sole making or selling* which he hath *not* or shall not have obtained letters patent, the name, or any *imitation* of the name of any other person who *hath* or shall have obtained letters patent for the sole making and vending of such thing, without consent of such patentee, or his assigns or legal representatives; or if any person, upon any such thing not having been purchased from the patentee, or some person who purchased it from or under such patentee, or not having the license or *consent of such patentee*, or his assigns or legal representatives, shall write, paint, print, mould, cast, carve, engrave, **STAMP**, or *otherwise make or affix* the word "patent," or the words "letters patent," or the word "patentee," or any word or words of *like kind, meaning, or import*, with the view or intent of *imitating or counterfeiting* the **STAMP**, mark, or other device of the patentee, or shall *affix* the same, or any word, **STAMP**, or device of *like import* on any *unpatented article*, for the purpose of deceiving the public, he, she, or they so offending shall be liable for such offence to a penalty of not less than ONE HUNDRED DOLLARS, (for *each and every article*) **WITH COSTS**, to be recovered by action in any of the Circuit Courts of the United States, or in any of the District Courts of the United States having the powers and jurisdiction of a Circuit Court; *one-half* of which penalty, as recovered, shall be paid to the Patent Fund, and the other half to *any person* who shall sue for the same.

Extract from United States Patent Laws, Sect. 6, of the Act of 1842.

And be it further enacted, That all *patentees* and *assignees* of patents hereafter granted are hereby required to **STAMP**, engrave, or *cause* to be stamped or engraved, on *each article* vended or *offered* for sale, *the date of the patent*; and if *any person or persons*, patentees or assignees, shall neglect to do so, he, she, or they shall be liable to the *same penalty*, (ONE HUNDRED DOLLARS and COSTS,) for *each and every article*, to be recovered and disposed of in the manner specified in the foregoing Fifth Section of this Act.


Extract from United States Patent Laws, Sect. 13, of the Act of March 2d, 1861.

And be it further enacted, That in all cases where an article is *made or vended* by *any person* under the protection of Letters Patent, it shall be the duty of such person to give sufficient *notice to the public* that said article *is so patented* either by fixing thereon the word **PATENTED**, together with the DAY and YEAR the patent was granted, or when, from the character of the article patented, that may be impracticable, by enveloping one or more of the said articles, and affixing a label to the package, or otherwise attaching thereto a label, on which the notice with the date is printed; on failure of which, in any suit for the infringement of letters patent by the party failing so to mark the article the right of which is infringed upon, no damage shall be recovered by the plaintiff, *except on proof that the defendant was duly notified* of the infringement and continued after such **NOTICE** to make and vend the article patented.

N. B. Making or vending the Patent Last, for any other than the patentee, without his consent, constitutes an infringement.

Making the Patent Boot or Shoe, without *license* therefor, also constitutes an infringement.

Selling or *offering* for sale the Patent Boot or Shoe, without the PATENT STAMP, constitutes an infringement.

 *All infringements will be dealt with according to Law.*

N. B. Two separate and entirely distinct Patents having been granted, one "*for Improvements in Shoemakers' Lasts*," another "*for Improvements in the Construction of Boots and Shoes*,"

It should be distinctly understood, that possession of the *Patent Last* does not, in itself, convey or *imply* the right to make the *Patent Boot*, which can only be acquired by special license therefor.

State of Maine.

IN THE YEAR OF OUR LORD ONE THOUSAND EIGHT HUNDRED AND SIXTY-TWO.

AN ACT

TO INCORPORATE "THE PLUMER PATENT LAST, BOOT AND SHOE COMPANY."

Be it enacted by the Senate and House of Representatives in Legislature assembled, as follows:—

SECTION 1. John C. Plumer, T. V. Shaw, Chandler Sprague, David Robinson, Jr., and J. C. Lindsley, with their associates and successors, are hereby constituted a body politic and corporate by the name of the

"PLUMER PATENT LAST, BOOT AND SHOE COMPANY,"

For the purpose of manufacturing and selling boot and shoe lasts, and boots and shoes, and doing such other business as may be connected with said manufacture, said business to be carried on in the city of Portland, with all the powers and privileges, and subject to all the duties and liabilities provided in the laws of this State concerning manufacturing companies.

SECT. 2. Said corporation is authorized to take and hold estate, real and personal, to the amount of three hundred thousand dollars.

SECT. 3. This act shall take effect from and after its approval by the Governor.

In House of Representatives, March 18, 1862.

This bill having had three several readings, passed to be enacted.

In Senate, March 19, 1862.

This bill having had two several readings, passed to be enacted.

Approved March 19, 1862.

J. G. BLAINE, *Speaker.*

J. H. GOODWIN, *President.*

ISRAEL WASHBURN, JR.

STATE OF MAINE.

OFFICE OF THE SECRETARY OF STATE, Augusta, April 4, 1862.

JOSEPH B. HALL, *Secretary of State.*

I hereby certify that the foregoing is a true copy of the original, as deposited in this office.

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